

Handbook of Research on

# Organizational Culture Strategies for Effective Knowledge Management and Performance



Dana Tessier



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# Handbook of Research on Organizational Culture Strategies for Effective Knowledge Management and Performance

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Knowledge management as a set of activities has been around for as long as humans have been able to communicate. In the modern world, knowledge management has become a multiple billion-dollar industry. Organizations know that their existence and growth rely on effective knowledge management programs and systems. But knowledge management efforts continue to experience high failure rates. Contributing to those failures is a lack of understanding the most important element of the system: the human. It is humans that have and create the knowledge. It is humans that build on the knowledge. And it is humans that are asked to share their knowledge. But there has been limited studies on understanding the motivations and behaviors of users in the context of knowledge management systems. This chapter explores the use of psychological contracts and positive psychology theories to explain and predict users' behaviors in knowledge management systems.

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Trust is a critical element when building knowledge management practices within an organization. For individuals and teams to share knowledge and collaborate, they must form a relationship that is based on trust. The role of trust within knowledge-sharing, and therefore collaboration and cooperation, will be discussed. In a multinational, distributed, remote work environment, colleagues will interact with content created by their peers before they interact with them, and therefore, digital repositories and content become an extension of the trust relationship between colleagues and even the organization itself. The trust required to facilitate knowledge-sharing will need to be extended to these digital environments so

that the organization can maintain its competitive advantage and the benefits of effective knowledge management practices.

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In order for knowledge management (KM) to thrive, an organization requires a combination of conditions that form the runway from which a KM initiative can take off. There is general agreement that technology, human resources, organizational culture, and leadership are among the key enablers of successful KM. The intentions and actions of knowledge leaders in particular can make a profound difference to how KM is institutionalized in an organization. The relationship between leadership and KM has been studied extensively, especially established leadership styles such as transformational and transactional leadership. In this chapter, the authors explore the influence of knowledge leadership on KM through the lens of Liz Wiseman’s leadership paradigm, Multipliers. The authors propose that effective knowledge leadership reflects the traits of the multiplier: leaders who draw on certain skills and approaches to effectively “multiply” the intelligence of an organization.

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When a company encodes the creation and maintenance of knowledge into its values and behaviors in a way that supports continuous improvement and learning, they are truly knowledge-driven. These knowledge-driven organizations are proven to be better at making decisions. When companies make better and more transparent decisions, their employees are more engaged, and their customers are more successful. Ultimately, knowledge-driven cultures increase revenue, bring products to market more efficiently, streamline internal communications, and onboard new hires faster. The best companies in the world operate this way – learn how they do it.

### Chapter 5

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*Michael L. W. Jones, Sheridan College, Canada*

This chapter examines issues of knowledge management and cultural knowledge in the context of Formula SAE student engineering teams. Approximately 500 student teams field a small formula-style racecar in a series of annual competitions held globally. Despite being small, student-run teams with limited resources and high organizational turnover, strong teams have developed strategies to sustain knowledge creation and work to build the team’s cultural knowledge over multiple annual design cycles. This chapter highlights three knowledge management challenges: organizational renewal due to graduation of senior members, capturing vital yet departing tacit and explicit knowledge, and engaging multi-year and collaborative projects. The chapter recommends that strong faculty and institutional support can help FSAE teams

develop into stable knowing organizations with deep tacit, explicit, and cultural knowledge bases.

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*Mehmet Kiziloglu, Pamukkale University, Turkey*

All companies in today's world are in intense competition. In order to survive the competition and always be one step ahead, all industries are required to give considerable importance to creating adhocracy culture within the firm, according to which employees must be provided with freedom and support. The employees should be encouraged to share their ideas and point of views with others and to take risks because today's most valuable asset is knowledge. This can ultimately help in enhancing creativity and innovation within the firm. The use of supportive culture is helpful for ensuring effective knowledge management practices within the firm. The focus of this research study was on investigating the importance of adhocracy organizational culture in terms of ensuring effective knowledge management. Based on findings of this study, it was found that there is a significant positive impact of adhocracy organizational culture on effective knowledge management.

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*Nick Chandler, Budapest Business School, Hungary*

This chapter considers the effect of subcultures in large complex organizations upon knowledge management. It is found that subcultures offer both advantages and disadvantages to organisations with knowledge management processes. On the one hand, the diversity of subcultures also offers a diversity of approaches and focus of knowledge management within subcultures. On the other, subcultures are found in the literature to present boundaries to cross-subcultural knowledge transfer. In essence, knowledge management is enhanced within subcultures, and there is a diversity of knowledge management processes as well as conversion of different types of knowledge specific to each subculture type, but knowledge sharing and transfer between subcultures is problematic. Through the examination of previous empirical studies and evidence from the author's own study, strategies are suggested along with a proposed model for managing knowledge across subcultures in large complex organisations, and further implications are highlighted for researchers and practitioners.

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*Ayman Abu-Rumman, Al-Ahliyya Amman University, Jordan*

This chapter explores the enablers and inhibitors to effective knowledge sharing practices within different contexts and fields of work. It covers the benefits of knowledge sharing and explores some of the most commonly used methods referencing the experiences within the banking and financial sector, the higher education sector, the automotive industry, and within the field of community development. Reference is also made to the experiences of knowledge sharing in light of the COVID-19 pandemic. The chapter concludes by asserting that a 'one size fits all' approach to knowledge sharing and knowledge management is not feasible, but argues that there is equally strong evidence to support the view that

knowledge sharing should be a key priority for all organizations in order for them to be sustainable and relevant in the longer term.

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Organizations are facing many challenges to remain relevant in the face of new technology, emerging markets, and changing consumer behaviors. Many organizations look to become learning organizations with knowledge management strategies to leverage their knowledge assets and continuously innovate their strategies and products. However, organizations struggle to achieve success with knowledge management because their organizational culture does not support knowledge-sharing and must be adapted for this new behavior. Knowledge must flow through the organization, and so, therefore, these necessary behaviors must work within the existing corporate culture. Observations from a case study at a software company are discussed, and a new knowledge management model, the Knowledge Management Triangle, is introduced. The Knowledge Management Triangle is a simple model to explain and implement knowledge management within organizations and is customizable to work within the organization's culture to ensure the new knowledge management behaviors are appropriately adopted.

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Organisations know they should do lessons learned. Standards like ISO9001 and ISO30401 say they should. Many try; few succeed. Traditionally, the first answer to the question is “lessons were observed, but not learned,” which reflects meaningful action was not taken as a result of the reported lesson. A lesson may have been identified, but nothing changed. As a result, learning did not happen. So why is this so? It is important to identify the ways in which the process towards effective lesson learning is becoming lost within the stages and how knowledge practitioners and those responsible for lessons learned can best help. This chapter will attempt to drill down on this answer, concentrating on the processes deployed and the real-world issues around the lesson-learning process.

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This chapter will describe methodologies and strategies that can help knowledge management, business development, and other change-making professionals drive organizational change leveraging a knowledge management approach. It describes an end-to-end methodology to drive change with a combination of knowledge management methods. The methodology is structured in five steps: setting up transformation teams, discovering in-house knowledge, creating internal capabilities, facilitating experimental execution, and impact evaluation. Issues discussed in the literature review include the nature of organizational change, why organizations change and how, the need for innovation, why organizations resist change, and how knowledge management facilitates organizational change.

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A learning organization is one that is consistently capable of adaptive change in response to signals from its environment. However, knowledge management initiatives to enact learning organizations have not been uniformly successful. This chapter focuses on the role of the psychological environment of the individual in enabling or hampering organizational learning. Six theories drawn from multiple fields are reviewed to identify both opportunities and barriers to fostering change at the level of the individual. These include orientation to learning, motivation to act, and capacity for change. However, the authors argue that organizations ought to be regarded as complex social systems. Change strategies intended to foster a learning organization are more likely to succeed if they embrace the idea that designing change for complex social systems requires a special approach: design thinking. This is characterized by iterative prototyping, experimenting, trialing, and piloting changes to work processes, structures, and tasks.

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<i>Jens Degn-Andersen, Ubisoft Entertainment SA, Canada</i>	

To improve knowledge sharing at the video game company Ubisoft, the knowledge management team investigated the key elements comprising a knowledge sharing culture. A knowledge sharing culture circle outlining both enablers and barriers to effective knowledge sharing is constructed. The five enablers—the nature of knowledge, opportunities to share, motivation to share, the culture and work environment, and trust—should be supported to strengthen knowledge sharing. At the same time, the barriers hindering efficient knowledge sharing at Ubisoft—confidentiality, knowledge hoarding, competition, and lack of prioritization—must be addressed to leverage the benefits of shared knowledge. The interconnected nature of both the enablers and the barriers must be taken into account when constructing initiatives intended to strengthen a culture of knowledge sharing. Five initiatives are described: a new content management paradigm, strengthened internal job communities, redefined internal security policies, objectives and key results on knowledge sharing, and targeted training.

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<i>Kimiz Dalkir, McGill University, Canada</i>	

One of the greatest challenges of effectively managing knowledge in an organization is promoting seamless connections of operations between departments. Historically, information systems supporting operations have been developed with a specific department's culture in background. Therefore, connecting data, information systems, and people across the product lifecycle is an ongoing puzzle for organizations. Theorists and practitioners agree on the need to include employees' expertise and vision in this process.

This chapter explores a tacit knowledge capture tool and a methodology to use it as a means to voice the interaction and negotiation among employees to support KM and IT strategy and development choices. Concept maps collaborative creation can provide a usability tool focused on meaning throughout the product lifecycle. A literature review of the challenges involved and of the proposed tool is presented, followed by a use case and the methodology for the concept map collaborative creation session, concluded with recommendations drawn from theory and practice.

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*Colin D. Furness, University of Toronto, Canada*  
*Chun Wei Choo, University of Toronto, Canada*

Office work is increasingly collaborative in the 21st century. ‘Information culture’ is a broad set of values and behavioural workplace norms pertaining to information management and use. To investigate whether information culture influences use of collaborative information tools, conceptualization and measurement instruments are presented for information culture and measuring effective use. ‘Group adoption’ is a behavioural proxy for effective use, and ‘information sharing’ and ‘proactive information use’ were selected as behavioural proxies for information culture. In a study of an engineering firm, group adoption was correlated with actual use of an information tool and with two tool attitude measures. Group adoption was also correlated with both information culture measures. The findings here suggest new avenues of research into the broader applicability of group adoption, and the ways in which conceptualization and measurement of information culture may be further developed.

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It’s in the Vault: A Case Study of Lessons Learned From Rebuilding Shopify’s Company-Wide Wiki..... 306  
*Kristy Popwell, Shopify, Canada*  
*Kathleen Cauley, Shopify, Canada*

This chapter is a case study of the rebuild of Shopify’s internal wiki (intranet) and describes the approach of updating the wiki and explores the elements that made the project a success. The problems with the existing tool are presented along with the strategies used to remedy these issues and rebuild the wiki. The project harnessed Shopify’s culture of trust, accountability, and transparency to create a tool authentic to the needs of the company. At the heart of the project’s approach is the people, process, and technology trifecta that the project team was built upon. This cross-functional team intersected change management, communications, knowledge management, and developers. Readers of this chapter will learn the approach and methodology of composing a project team based on this trifecta and how it led to the successful rebuild of Shopify’s wiki. Although Shopify had the opportunity to build its tool internally, this chapter is not a showcase of the tool; the focus is on the approach and strategies of the project team, which can be applied to any intranet-like project.

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## Preface

Organizations are facing many tough challenges in response to rapidly changing technology, evolving regulations, and competition. As Canadian Prime Minister Justin Trudeau said during his 2018 World Economic Forum address, “the pace of change has never been this fast, yet it will never be this slow again” (para 17). The pace of change has placed an imperative for organizations to be innovative, and organizations are looking to implement learning cultures to meet this need for innovation, agility, and change (Groysberg et al., 2018; Schein, 2017). These innovative organizations need to constantly generate valuable knowledge that is leverageable for organizational improvements (Drenik, 2020; Nonaka, 2007; Ihrig & MacMillan, 2015; Davenport & Prusak, 1998). By investing in knowledge management (KM) activities, the organization can leverage knowledge in its processes, making it more effective and enabling continuous improvement (King, 2009; Zheng et al., 2010). By becoming a learning organization, one that is constantly leveraging its knowledge assets, an organization will share knowledge, improve decision-making, and reduce repeat errors which will, in turn, enable innovation and allow companies to stay ahead of competitors (Nonaka et al., 2006; Davenport & Prusak, 1998).

In Deloitte’s 2020 Global Human Capital Trends report, they found that one of the key differentiators for organizations is their ability to use knowledge to drive organizational performance (Volini et al., 2020) and that 52% of their respondents indicated that changes in the workforce are motivating them to implement more KM strategies. KM practices have been around for a few decades now, yet many organizations still struggle with implementing and adopting KM strategies. Deloitte found that while 75% of organizations surveyed stated that leveraging knowledge is important or very important for their success over the next 12-18 months, only 9 percent are ready to address their gaps in this area. The research shows that many organizations are struggling with the human side of KM. Leaders are approaching KM as a technology problem and implementing new technologies to facilitate the exchange and flow of knowledge, and then they do not see the results they are looking for (DeTienne et al., 2004; Chang & Lin, 2015; Janz & Prasarnphanich, 2003). It is commonly cited that over 80% of KM implementations fail (Barnes & Milton, 2015), but it is usually due to organizational culture rather than a lack of suitable technology. In addition, it was found that organizational silos, a lack of incentives, frequent changes in the workforce such as employee turnover and movement, and a lack of KM aligning to a corporate mandate also created barriers for KM’s success in organizations (Volini et al., 2020). Sharing knowledge is a social exchange and requires that the organization’s culture support this exchange; it requires trust, and it requires that leaders both value and model this behavior (O’Dell & Hubert, 2011; DeTienne et al., 2004; Intezari et al., 2017).

For organizations and KM practitioners embarking on a KM implementation, understanding the organization’s current state and culture should be the first step (Dalkir, 2011), and yet, culture is still

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a common barrier to successful implementations (Barnes & Milton, 2015). It is often recommended that practitioners begin working on the KM strategy without waiting for a favorable culture (Milton & Lambe, 2016; Dalkir, 2011). How are organizations and KM practitioners supposed to proceed? Culture is a critical success factor for KM, and yet KM cannot wait for the culture to support it. The culture shift needs to be part of the KM strategy, but KM practitioners are often unprepared for this task. There are many ways in which the KM strategy and the organizational culture will interact, and the various culture dynamics need to be woven into the KM strategy to ensure the long-term success of KM within the organization (DeTienne et al., 2004; Chang & Lin, 2015; O'Dell & Grayson, 1998). Cultural transformations are difficult, and for KM to be successful, that is what it will require; therefore, each KM task, strategy, and effort will need to leverage cultural change best practices to ensure long-term success.

## **OBJECTIVES OF BOOK**

Organizational culture is becoming more and more critical for organizations to create a competitive advantage, and so is knowledge management. By furthering research on how these fields of research interact, this book provides valuable information to practitioners and academics in the field of information science. Organizational culture is often one chapter in a book on knowledge management, whereas it is the through-line of this book. The relationship between organizational culture and knowledge management is defined, and cultural barriers to implementing knowledge management strategies are identified. Strategies for effectively navigating organizational culture are shared both in theory and through case studies from successful companies worldwide. This includes identifying why some knowledge management strategies will be successful in one organization but fail in another. As organizations go through digital transformations brought on by the Covid-19 pandemic, both knowledge management practices and effective organizational culture strategies will enable organizations to thrive, and so this book provides insights that will guide practitioners and business leaders through navigating these challenging times.

## **TARGET AUDIENCE**

This book will benefit KM practitioners, business leaders, educators, and students. KM practitioners will be better equipped to build and implement KM strategies that effectively navigate culture and are more successful as a result. Business leaders will learn about the benefits of learning organizations and the different elements needed to deliver their intended outcomes. Educators will benefit from a rich discussion of knowledge management practices that includes real-world examples, and ultimately that will benefit students learning about knowledge management. This book furthers critical research on how organizations can thrive and adapt due to emerging global disruptions, and this will benefit the fields of information science, knowledge management, and business.

## **OVERVIEW OF CHAPTERS**

This book is organized into three sections: people, process, and tools and technology. The people, process, technology framework is a commonly used framework in information technology projects. The

framework's objective is to ensure projects consider all three elements during the implementation phase to ensure the successful completion of the project. The People section discusses motivations, behaviors, leadership roles and responsibilities, as well as different cultures and how knowledge management can work within them. The Process section discusses different practices, processes, strategies, and theories that help when implementing knowledge management within organizations. The Tools and Technology section includes tools that will enable effective knowledge management strategies within the organization and a case study that brings together many of these elements to demonstrate an effective technology implementation that works with the prevalent organizational culture.

## People

- “Motivations of Knowledge Management Practitioners: Positive Psychology and Psychological Contracts” by Leland Holmquest. Many knowledge management programs leverage a feeling of community and helping others as cornerstones of their communication campaign to win the hearts and minds of their audiences; however, this chapter identifies that this may not be the key motivator for individuals to actively participate in KM programs. This chapter provides an overview of learnings from positive psychology and psychological contracts, which are often not discussed in the context of knowledge management programs. Data from a study in 2018 and recreated data demonstrate that appealing to the individual's sense of accomplishment would be a more significant motivator when implementing knowledge management practices in an organization. This finding could have broad impacts on the success of knowledge management initiatives in the future.
- “Knowledge Sharing in a Digital, Remote, and Disrupted World: The Role of Trust” by Dana Tessier. For knowledge management strategies to be successful, individuals and teams need to share knowledge with each other. Trust plays a crucial role in enabling knowledge-sharing behaviors within individuals and teams. Due to the transition to remote and hybrid organizational models, many workers will need to share knowledge with people they have not yet met in person, and therefore may not have established a trusting relationship. Knowledge will be shared through digital repositories and systems. Knowledge practitioners and business leaders will need to navigate the barriers to trust to ensure successful knowledge sharing, and so this chapter provides an overview of how trust develops, the different barriers to trust in knowledge-sharing, and practical strategies for building a high-trust culture to promote knowledge sharing while navigating new ways of working in remote and hybrid models.
- “Knowledge Leaders as Multipliers: Creating and Promoting the Conditions for Successful Knowledge Management” by Renée López-Richer and Caroline Thompson. This chapter explores the role leadership plays in successful knowledge management implementations. For knowledge management to be successful, there are organizational enablers that need to be aligned, and the role of leadership is crucial. Leadership traits from Liz Wiseman's book *The Multipliers* are leveraged as a framework for understanding the specific skills and methodologies that should be leveraged by leaders when implementing and maintaining a successful knowledge management strategy for their organization. Leaders who act as *Talent Magnets*, *Liberators*, *Challengers*, *Debate Makers*, and *Investors* will encourage their teams' proper mindsets and behaviors to ensure successful knowledge-sharing, and learning behaviors occur.

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- “How the Best Companies in the World and their Employees Are Winning With Knowledge-Driven Cultures” by Rick Nucci and Steve Mayernick. This chapter shares proprietary research that demonstrates that knowledge-driven cultures help organizations perform better with decision-making, working in remote and hybrid models, and this positively impacts the employees experience leading to better results overall. Sharing examples from Noom, Zoom, Square, and Guru, this chapters provides an overview of the pillars that make up a knowledge-driven culture. The pillars of a knowledge-driven culture are 1) Creation and Maintenance, 2) Continuous Improvement and Learning, 3) People, Process, and Measurement, and 4) Knowledge values and behaviors. Lastly, the chapter includes a maturity model for organizations to self-assess their current state and it provides clear steps on how organizations can become knowledge-driven.
- “Knowledge Management in Emergent Amateur Organizational Cultures: Observations From Formula SAE Student Engineering Teams” by Michael L. W. Jones. This chapter examines the organizational culture and knowledge management practices in student teams that design and build a small formula-style race car and compete in global competitions. The chapter describes three main obstacles that challenge the teams: organizational turnover, knowledge capture, and sustaining success over multi-year collaborative projects. Cultural-historical activity theory (CHAT) is leveraged to analyze the teams’ different challenges and how the teams work through them. Teams that perform well and overcome their challenges are typically those with a supportive faculty advisor and those with adequate funding and resources. Furthermore, teams that have successfully leveraged information technology to build knowledge repositories with detailed notes from previous designs have performed better in the competition. It is interesting to note that funding and leadership are enablers of successful knowledge management programs in more established cultures, and so this chapter shows that these enablers are critical even in small and emergent cultures.
- “Impact of Adhocracy Organizational Culture on Effective Knowledge Management: Organizational Culture on Knowledge Management” by Mehmet Kiziloglu. This chapter provides research conducted on Turkish construction companies and finds that those with an adhocracy organizational culture positively impact the firm’s knowledge management initiatives. An adhocracy culture is defined as one that is focused on innovation and creation. This culture enables employees to feel comfortable taking risks and trusting each other, and both of these factors positively influence employees to share knowledge with each other. While the study is focused on Turkish construction companies, the author demonstrates how these companies operate as project-based organizations, and thus the findings can be extended to other project-based organizations as a model for effective cultures that lead to effective knowledge management practices.
- “Knowledge Management in Large Complex Organizations: The Subcultural Level” by Nicholas Chandler. This chapter discusses organizational culture and knowledge management and adds in the element of subcultures which exist within large organizations. By leveraging the Competing Values Framework developed by Cameron & Quinn, the author shares empirical evidence of how organizational cultures have subcultures and how, therefore, the knowledge management strategy used across the organization may need to differ to ensure it is adopted throughout the various cultures. The author also presents a model for working across subcultures by leveraging change agents and ambassadors to increase collaboration and communication.

## Process

- “Effective Knowledge Sharing: A Guide to the Key Enablers and Inhibitors” by Ayman Abu-Rumman. This chapter provides a thorough overview of the different enablers and inhibitors to knowledge sharing and offers specific examples from the automotive industry, aerospace industry, financial and banking sector, within higher education, during the Covid-19 pandemic, and to support community development. A knowledge-sharing enabler is something that helps knowledge sharing take place successfully, whereas a knowledge-sharing inhibitor is something that prevents this activity from taking place. This broad overview of examples will inspire practitioners with possibilities for a wide-range of knowledge sharing approaches.
- “Enabling Knowledge Flow: The Knowledge Management Triangle Model” by Dana Tessier. As organizations navigate digital transformations and innovations, knowledge management strategies can help organizations adapt and overcome challenges. This chapter introduces the Knowledge Management Triangle Model, which is a simple model for practitioners to leverage when implementing knowledge management within an organization. It promotes knowledge flowing through the organization to create action and value. It can be customized to the organization’s culture, and a case study of a successful implementation is provided to illustrate this effect.
- “Why Do Lessons Learned Often Fail? An Analysis of Experiences” by Ian Fry. This chapter introduces the lessons learned practice which is an effective method for organizations to capture their learnings and leverage this knowledge for future organizational improvements. The barriers to effective lesson-learning are discussed, as well as some potential solutions to these barriers. The chapter introduces a Knowledge Supply Chain that can be leveraged to implement a lessons learned program within an organization more effectively.
- “Facilitating Organizational Change With Knowledge Management” by Antonio Moneo Lain. In the ever-changing business landscape of the twenty-first century, organizations will need to go through large-scale change projects to stay relevant, effective, innovative, and productive. In this chapter, a method for organizational change that is supported by knowledge management practices is presented. This process includes setting up a transformation team, aligning on the discovery and the scope of the initiative, building the correct capabilities for the change, conducting pilot projects and experiments, and measuring the intended outcomes and impact.
- “Towards a Learning Organization: Understanding Barriers, Levers, and Employees’ Capacity for Change” by Anindita A. Bose and Colin Furness. As organizations implement more technology to enable themselves to be *smarter*, the success rate of these initiatives is hit or miss. Organizations must adopt different practices and mindsets to enable themselves to be a *Learning Organization* that is adept at changing due to what it is learning. This chapter provides an overview of six theories to enable a deeper understanding of the components that make up a Learning Organization: Communities of Practice, Single-loop vs. Double-loop Learning, Principle of Least Effort, Transtheoretical Model, Cognitive Dissonance Theory, and System Justification Theory. Lastly, the authors describe design thinking and how this iterative approach to product management can enable organizations to design and develop complex systems more effectively and build more successful learning organizations.
- “Strengthening an Organizational Knowledge Sharing Culture” by Jens Degn-Anderson. This chapter provides a case study analysis of current knowledge sharing inhibitors at Ubisoft, a multinational video game production company. The author provides insight into how the Ubisoft KM

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team identified various gaps and challenges within the culture that were preventing knowledge sharing. These examples will provide other KM practitioners guideposts to look out for in their own knowledge management strategies to avoid similar challenges. Using both the analysis of the current state, as well as solutions based on theory, the author proposes five initiatives to improve the knowledge management strategy, while navigating and potentially changing the organizational culture elements that are currently a barrier to their success.

## Tools and Technology

- “A Closer Look at Concept Maps Collaborative Creation in Product Lifecycle Management” by Daniela Oliveira, Mickael Gardoni, and Kimiz Dalkir. Transferring tacit knowledge within an organization can be a difficult task; explicit knowledge is easier to transfer since it is easy to write down. This chapter provides an overview of concept maps as a tool to facilitate tacit knowledge transfer and to enhance collaboration within an organization. The strength of implementing a concept map is to gather additional perspectives which will help practitioners understand previously unsaid or undocumented challenges and should allow better results to follow. This can also help organizations understand unintended consequences of actions on other departments, facilitating a deeper understanding of what is happening at the organization. Concept maps can be the starting point of ontologies, controlled vocabularies, or taxonomies.
- “Information Culture and Effective Use of Information Tools at Work: Conceptualizing and Measuring Group Adoption” by Colin Furness and Chun Wei Choo. Organizations often implement technology to facilitate collaboration and other knowledge management initiatives. Organizations need their technology adopted to ensure a return on this investment. This chapter discusses how the information culture of an organization affects group adoption. Identifying both the group adoption and the information culture of an organization will provide practitioners with a more fulsome picture of any potential problems or barriers impacting their technology implementation. Information culture is the norms and behaviors of an organization that influence its use of information. Group adoption is a measure of how prevalent a tool has been adopted within the group.
- “It’s in the Vault: A Case Study of Lessons Learned From Rebuilding Shopify’s Company-Wide Wiki” by Kristy Popwell & Kathleen Cauley. The “people, process, technology” model sets knowledge management initiatives up for success. This case study provides an in-depth look at how Shopify’s Knowledge Management team partnered with the Technology team and the people in the organization to implement a new company-wide wiki. Shopify has a strongly defined culture, and this chapter provides examples of how to identify this and how the wiki initiative took cues from the culture throughout the design and implementation process to ensure this project was a success. This chapter provides a great example of KM practitioners working with the organizational culture to ensure their knowledge management implementation is successful.

## CONCLUSION

Knowledge management practices have come a long way since their emergence in the 1990s. However, the majority of KM implementations fail to make an impact. By leveraging an understanding of organi-

zational culture, and other effective knowledge management enablers such as leadership behavior, tacit knowledge sharing strategies, and incentives, KM practitioners have a greater chance at success. Success in knowledge management is needed now more than ever as organizations adopt and transform after the disruption of the Covid-19 pandemic amongst other longstanding challenges such as changing consumer trends, technological innovations, and a skill gap amongst workers. The successful organizations of the future will effectively leverage their knowledge assets to stay ahead of their competitors and meet the emerging needs of their customers; to do so, they will need organizational culture strategies for effective knowledge management and performance.

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# Introduction

Organizations today are facing major disruptions in technology, consumer preferences, and in the workforce. Many businesses need to go through digital transformations to stay relevant, and the ones that do perform better financially due to improvements in customer satisfaction, innovation, and even employee engagement (Gurumurthy et al., 2020). The successful organizations of the future will be the ones that navigate challenges, learn and adapt quickly, and ultimately are more than the sum of their parts. Effective knowledge management practices leveraged through a supportive organizational culture will help organizations achieve these outcomes and outlast their competitors. This introduction will discuss the challenges facing businesses today and how organizational culture and knowledge management play critical roles in helping organizations overcome these challenges and thrive in the digital workplace of the future.

Due to changes in technology, and other factors, many employees will need to develop new skills; the World Economic Forum estimates that by 2022, 54% of all employees will require significant learning to acquire new skills (World Economic Forum, 2018). In an updated report in 2021, it was found that this reskilling was even more urgent in the post-COVID-19 economy (World Economic Forum, 2021). Many businesses plan to leverage contractors or other flexible workers to fill these gaps (World Economic Forum, 2018), whereas other companies are seeking flexible workers to save on costs (Gartner, 2020). Reskilling workers will be critical in the post-pandemic recovery to move laid-off workers to industries that are experiencing productivity gaps and challenges, especially as they adapt to new safety regulations (Enders et al., 2020; Agrawal et al., 2020). While there is an increasing need to create more tech-savvy employees, there are currently over 1 billion knowledge workers worldwide. Those from younger generations are more likely to change jobs if their organization does not match their values (Ricard, 2020). Consumer trends are changing; the millennial generation has furthered some trends that have been underway for a while, namely getting married later, having children later, and at the same time, they are under greater financial constraints than previous generations (Lobaugh et al., 2019). As the US population changes and becomes more diverse as well as socially conscious, this has also driven changes in consumer behaviors (Lobaugh et al., 2019). This shift in consumer behaviors is echoed in changes to the workforce, where workers are looking for more personal satisfaction and alignment with their values from their employer (Volini et al., 2020a). Emerging environment factors will force organizations to adapt to both a change in the makeup of their workers, as well as shifts in consumer behaviors.

The COVID-19 pandemic has made dramatic changes to many organizations and industries. It is estimated that 48% of US employees will likely work from home after the COVID-19 pandemic, whereas only 30% did before the pandemic (Gartner, 2020). The option to work-from-home is concentrated in sectors that have highly skilled and educated workers, such as knowledge workers. Many businesses

plan to create a hybrid model where employees work from the office only a few days a week, and the rest of the week, they work from home (Lund et al., 2020). The hybrid model is attractive because it provides lower costs but improved flexibility for employees, which positively impacts their work-life balance (Alexander et al., 2020). Other organizations are moving to a fully remote model and allowing employees to work from anywhere. These remote and distributed programs are showing to be a powerful incentive to attract talent, maintain loyalty, enable better work-life balance, and motivate employees to do their best (Choudhury et al., 2021). This significant change to how employees work will have ripple effects throughout the organization, and massive technological changes will need to occur to support this transition. Whether organizations return to the office, use a hybrid model, or go fully remote, each model will have its challenges in the post-pandemic world. Organizations that force workers to return to the office may have a retention issue with employees who have enjoyed working from home and want to continue doing so. Hybrid models have to adapt their in-office practices to ensure they do not alienate their remote workers. Fully remote models will be challenged with maintaining relationships and cohesion. Furthermore, how organizations work with their clients will change. Many of the COVID-19 innovations that created more accessible options for consumers, such as curbside pick-up at retail and grocery stores, will be here to stay. It will take agile, adaptable, and creative organizations to stay competitive in this new paradigm.

Due to these changes in the workforce, consumer behaviors, and the technological acceleration brought on by the COVID-19 pandemic, all organizations will need to adapt their digital strategies. Organizations will need to consider new ways of working and ensure new technologies are adopted by their workforce (Drenik, 2020). These new ways of working are a struggle for many, and in a recent study, 37% of knowledge workers reported that they did not have access to the information they needed to do their job (Ricard, 2020). In a study conducted by APQC, they found that 52% of respondents were moving to a long-term or permanent remote work model and that this was leading to changes in their business strategy. Furthermore, they found over 80% of respondents said they relied on their technology much more than in previous years. This new reliance was creating challenges whereby the current solutions were not meeting the new, emerging expectations. The main issues were also related to challenges in finding relevant information, and this was found to be slowing down productivity (APQC, 2021). Teams that are geographically dispersed, working on complex tasks, and those low in social capital (like new hires) were shown to benefit the most from documented organizational knowledge (Staats et al., 2010). As more organizations go through digital transformations brought on by remote working, changes in strategy, and technological advances, the need for digital collaboration as a critical competency becomes increasingly important.

Peter Drucker (1992), one of the leading thinkers on management, notes that “every organization will have to learn to exploit its knowledge, that is, to develop the next generation of applications from its own successes” (para 16). Organizational health is vital at all times, but especially during times of change, as this is when organizations most need to move quickly, align their employees to new missions, and deliver results. It was found that organizations that leverage their knowledge and disseminate knowledge quickly are able to rise to this challenge and outperform their competitors (Dagan et al., 2020). Implementing a knowledge management (KM) strategy is one of the ways organizations look to improve organizational effectiveness, innovation and adapt to changing circumstances. An effective KM strategy is how an organization can identify, capture, create, share, and use knowledge that exists within the organization and can leverage these knowledge activities to bring about organizational learning, and therefore improved performance. To have a successful KM strategy, organizations need to focus

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on including the right people, implementing the correct processes, and leveraging effective technology. An organization's ability to learn from its employees' collective experiences, make better decisions, and innovate based on its own learning will be crucial to organizations' thriving in a rapidly changing world.

Knowledge management relies on individuals to effectively share knowledge and take knowledge from others, and these are human behaviors that are filled with nuance. Furthermore, organizations are complex and have longstanding traditions, rituals, and ways of working that materialize as organizational culture, and these can either prevent or encourage knowledge sharing and its benefits. There is increasing evidence to support that an organization's culture is imperative to the success of the KM strategy (O'Dell & Hubert, 2011; Intezari et al., 2017; Essawi & Tilchin, 2013; Hatten & Rosenthal, 2002, DeTienne, et al., 2004; Chang & Lin, 2015; Rai, 2011; Janz and Prasarnphanich, 2003; De Long & Fahey, 2000; Dalkir, 2011); however, while culture is often discussed in KM literature, there is not much research or focus on how to shift organizational cultures to support KM. What is organizational culture, and why is it so crucial for KM to be successful? Organizational culture is typically defined as the way work actually gets done within an organization; it encompasses the organization's prevalent values, beliefs, and behaviors (Groysberg et al., 2018; Volini et al., 2020b). The culture of an organization will likely dictate how important KM activities are perceived and valued, such as whether or not employees will want to share their knowledge or hoard it and whether they will participate in learning activities (O'Dell & Hubert, 2011; Intezari et al., 2017; Gray & Densten, 2005; DeTienne et al., 2004; Volini et al., 2020a, De Long & Fahey, 2000). Organizational culture will also determine if silos exist between teams and departments, which can prevent the flow of knowledge. Silos, a lack of risk-taking, and the inability to leverage customer insights are among the top challenges for a successful organizational culture in the digital age (Goran et al., 2017). Culture often dictates how employees are treated; employee compensation and rewards will impact the choices employees make and how they choose to get their jobs done, and therefore this will also impact the adoption of knowledge sharing behaviors (DeTienne et al., 2004; Chang & Lin, 2015). It is clear that the organization's KM strategy and culture need to intersect and support each other.

The importance of a strong organizational culture is on the rise as workers look for greater satisfaction and alignment with their personal values (Volini et al., 2020b), and organizational culture has been shown to drive critical organizational outcomes in challenging environments (Groysberg et al., 2018). Healthy organizational culture also impacts financial performance (Goran et al., 2017). Research published by McKinsey & Company found that organizations with strong cultures provide 60% higher returns to shareholders (Dewar & Doucette, 2018). They found that organizations with strong cultures are more likely to adapt to challenges and transform their businesses to meet the emerging needs of their industry, whereas 70% of transformation failures were due to a poor performing culture (para 8). In addition, an organization's capability to create a sense of belonging, be inclusive and foster diversity was also found to improve organizational performance (Volini et al., 2020b). Cultures could thrive when employees felt valued, included, and heard (Baumgartner, 2020). Furthermore, the challenges of the COVID-19 pandemic, including the increase in work-from-home models, will further exacerbate cultural challenges and many CEOs are concerned about how to maintain the corporate culture in these times (Gartner, 2020).

As organizations move to more remote working or hybrid models brought on by the Covid-19 pandemic, creating a strong culture that works remotely will be an important factor for business success. One of the tenets of building a solid remote culture is building robust social and learning environments (Lovegrove, 2020), and this is where the knowledge management program can reinforce the culture, and the culture can reinforce the appropriate knowledge management behaviors. Hybrid cultures will chal-

lenge organizations to ensure their remote culture and their in-office culture are the same. For remote employees to feel connected to the organization and its culture, they will need to feel like they are being treated fairly in relation to the in-office employees. If there is a divide between in-office and remote workers, this will create challenges in building a cohesive and robust culture (Alexander et al., 2020). When workers are geographically distributed, especially in different time zones, this is where a knowledge management program can help improve remote workers' productivity. Additionally, workers with low relationship capital also benefit from the knowledge management program as they are able to tap into organizational knowledge that they may have otherwise not known due to their low tenure or lack of connections within the organization, and this improves their overall efficiency (Staats et al., 2010). Therefore, knowledge management is especially valuable for remote or hybrid organizations, as well as those that are growing or reskilling their workforce.

Organizations typically do not take the time to create their culture explicitly (Dalkir, 2011); however, as many undertake transformations, a focus on culture will be necessary for long-term change. Daniel Coyle, the author of *The Culture Code*, has studied some of the world's most successful organizations and has identified what behaviors and elements make up a thriving organizational culture. He defines culture as a "set of living relationships working toward a shared goal. It's not something you are. It's something you do" (Coyle, 2018, p. 13). Coyle explains that through the organizations he interviewed, he found that the key elements to building a successful culture are to (1) Build Safety, (2) Share Vulnerability, and (3) Establish Purpose (2018, p. 12). Adam Grant, author and psychologist, identified that organizations are more effective when their employees help each other and freely share their knowledge with each other but that there are often cultural barriers that get in the way (Grant, 2013). KM practices can both enable and reinforce these cultural elements identified by Coyle and Grant, therefore strengthening the organizational culture. The cultural elements can also help reinforce the knowledge-sharing activities that will ensure KM is successful in the organization. There are many ways that the organizational culture can influence the KM strategy, specifically by introducing norms and behaviors that support knowledge sharing, collaboration, and communication (O'Dell & Hubert, 2011; Intezari et al., 2017). By introducing a shared purpose and a structure for knowledge exchange, organizations can unlock the benefits of collaboration (Adler et al., 2011) and ensure that knowledge is leveraged within the organization. Successful organizations that are navigating the many waves of change have used this shared purpose to create a connection with their employees to unite on overcoming their challenges to achieve this purpose (Drenik, 2020). One of the significant trends amongst the literature on KM and culture was trust; organizations need to place trust in employees and enable employees to trust each other to ensure knowledge sharing has the right conditions for success (O'Dell & Hubert, 2011; DeTienne et al., 2004; Coyle, 2018; Grant, 2013; Intezari et al. 2017; Essawi & Tilchin, 2013; Rai, 2011).

Cultures that value adaptability and that can react to change quickly have shown to perform better financially than those that lack that ability (Chatman & Gino, 2020). While knowledge management practices, specifically methods like lessons learned that focus on continuous improvement, can help organizations adapt to change quickly, a focus on learning will also be critical. A commitment to continuous learning and improvement based on this learning will help organizations prepare for the future (Lakomski, 2001), regardless of what it has in store. To foster this environment of ongoing learning, organizations look to become learning organizations. Learning organizations are those that identify, capture, store, use, reuse, and share knowledge. Learning is part of the everyday performance (Gorelick et al., 2004). For this learning to generate change within the organization, it must move the organization beyond its current practices and understandings and bring about new ways of working (Lakomski, 2001).

## Introduction

For a learning organization to be successful, it must have organizational learning processes where learning is part of a system, and the learning enhances the system; it is not just for the individual's benefit (Gorelick et al., 2004). Systematic learning and an ability to continuously change are not easy tasks for an organization. Knowledge management strategies and technologies can support the learning outcomes moving from the individual to the system (Gorelick et al., 2004). As previously mentioned, the support for this system and pattern of behavior will need to come from the organizational culture.

NASA is often celebrated as a successful learning organization with a strong KM strategy. They have said that to become a learning organization that demonstrates consistent results over time, the knowledge sharing and learning activities had to be pervasive and valued in each part of the work by every single person at NASA (NASA's PMO, 2013). Boeing leveraged learnings from their previous product development work to develop the 757 and 767 models, which launched without error, making them the most successful airplane launches the company had ever seen (Garvin, 1993). In the Human Capital Trend report by Deloitte, they found that organizations needed to be well-positioned with KM technology and a culture that promotes knowledge sharing and has the processes to support KM to deliver effective results (Volini et al., 2020a). For an organization to learn, grow, and innovate over time, organizational learning is critical, and this cannot happen without a robust knowledge management strategy (Gorelick et al., 2004). If the organization believes that each individual is additive to the culture and that each person can contribute their learning to the overall system and strengthen the organization in the process, then truly amazing results can occur due to organizational learning.

There is clearly an intersection between knowledge management and organizational culture. Based on the challenges facing organizations today, this intersection must be understood and leveraged to create the organizations of the future. Organizations will need to rapidly adapt to change while ensuring their employees stay connected and aligned to their mission. How will organizations thrive during these challenging times? How will they tap into their collective strengths, knowledge, and capabilities and overcome adversity? As organizations are being redefined, new capabilities and best practices will need to emerge to ensure businesses last and can create long-term impact. It is imperative that organizations focus on their culture; learning and adaptability will be crucial for organizations to survive. Knowledge management practices can support the organization in this learning and adaptation; the answer to how organizations overcome their current challenges is by knowing more and doing better as a result. Knowledge management cannot be successful without the right culture to support it. Therefore, organizations must focus on becoming a learning organization to achieve this continuous learning and adaptation. The digital organization of the future is one where culture and knowledge intersect, enable, and thrive.

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# Section 1

# People

# Chapter 1

## Motivations of Knowledge Management Practitioners: Positive Psychology and Psychological Contracts

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### ABSTRACT

*Knowledge management as a set of activities has been around for as long as humans have been able to communicate. In the modern world, knowledge management has become a multiple billion-dollar industry. Organizations know that their existence and growth rely on effective knowledge management programs and systems. But knowledge management efforts continue to experience high failure rates. Contributing to those failures is a lack of understanding the most important element of the system: the human. It is humans that have and create the knowledge. It is humans that build on the knowledge. And it is humans that are asked to share their knowledge. But there has been limited studies on understanding the motivations and behaviors of users in the context of knowledge management systems. This chapter explores the use of psychological contracts and positive psychology theories to explain and predict users' behaviors in knowledge management systems.*

### INTRODUCTION

One of the things that sets humans apart from the rest of the animal kingdom is codified knowledge. The insatiable appetite to learn the very fabric of nature. Even in the most primitive periods, humans conducted some of the activities of knowledge management (KM). Sitting around the fire after a hard day's work, humans would use the primitive language and means of communication to share their journey. Eating those berries will make you sick. These two rocks, when stuck together, creates sparks that can be used to start a fire. This plant's leaves are edible. Each of these useful facts are shared with one's

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tribe. Sharing this knowledge could mean the difference between life and death of the tribe. Arguably, humans sharing stories marked the earliest forms of knowledge management.

Modern times have transformed knowledge management. Instead of stories around the campfire, it is now sophisticated information technology (IT) systems. The tribe is now huge companies that span the globe. But for all the progress that has been made, knowledge management has yet to realize the value that practitioners have promoted for years. The general problem that this chapter will explore is KM programs have failed to produce the expected benefits (Vanini & Bochert, 2014). Part of the challenge is understanding the human element of these knowledge management systems (KMS). Many organizations begin their journeys in KM by implementing knowledge repositories, attempting to capitalize on users' intellectual assets and distribution. But ultimately these solutions are considered failures because few people use it. These failures are treated as an IT problem (Toukara, 2013) focusing on the technology issues. Few KM efforts demonstrate value after two years, and most are abandoned (Vanini & Bochert, 2014). Research of KM concentrates on the failures of the technical system rather than exploring the psychological barriers for users that prevent them for gaining the intended benefits of the KMS (Akhavan & Pezeshkan, 2014). A thorough review of literature did not yield any research in applying psychology-based theories to KM efforts to understand and potentially predict users' behaviors in a KMS until a study investigated using two psychological theories to understand human behaviors in KMS (Holmquest, 2018). Holmquest conducted a quantitative, correlational study to determine if these two psychological theories could be used to explain and predict users' behaviors in KMS (2018). The research questions listed in (Holmquest, 2018) derive from the PERMA model in positive psychology theory. PERMA is an acronym made up from the elements that comprise the construct of well-being. The PERMA model enables researchers to objectively and quantifiably measure an individual's subjective well-being. The elements that make up the PERMA model are:

*Table 1. Elements of well-being from PERMA model*

P	Positive emotion	Positive emotion is the subjective emotional interpretation of the past, present and future.
E	Engagement	Engagement is the psychological state of flow.
R	Relationship	Relationships are the positive relationships that the individual has that are healthy and lead to positivity in one's life.
M	Meaning	Meaning is very subjective. The individual assesses that his/her contribution is having an impact in reaching goals beyond ones' own life.
A	Accomplishment	Accomplishment is completing something that results in a connection to meaning for the individual.

The PERMA instrument and documentation can be found on the University of Pennsylvania School of Arts and Sciences website at <https://www.authenticchappiness.sas.upenn.edu/>. This instrument asks 23 questions with Likert answers ranging from 0 to 10. The questions assess the elements of an individual's well-being. Holmquest examined if the scores of an individual's PERMA assessment could correlate with their exhibited behaviors demonstrated in a KMS.

The specific problem that this chapter will explore is that KM efforts fail to address the human aspects of using a KMS (Paulin & Suneson, 2012). Having the most perfect technology solution for KM means little to nothing if the human users do not use and contribute to the KMS. But what are the motivations

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for an individual to participate in a KMS? Lacking a lens to examine and rationalize humans' behaviors, creating a system that humans will use is mostly leaving it to luck. And worse, the system can be established in ways that are counterproductive to its goals. For example, if a KM program uses language that promotes the benefit of the community at large to motivate individuals to participate in putting their knowledge into the system, and the users see this as a threat to their own value, then the message designed to motivate may actually result in motivating users to hoard their knowledge. Understanding the motivations of the users is a critical component to the success of any KM program. Yet, KM research has been largely a pathology, emphasizing what is going wrong and barriers, rather than what is going well (Cramer, 2011) and examining the motivations of its users. KM is treated as an IT problem (Toukara, 2013; Vanini & Bochert, 2014) focusing on engineering solutions and technology rather than seeking to understand the exhibited behaviors of the human. Compounding this problem is a lack of empirical research (Grant, 2011; Vanini & Bochert, 2014). In (Holmquest, 2018) a quantified research project was conducted to test whether psychological contract theory and positive psychology are valid theories that could be predictors to users' exhibited behaviors in KMS. Multiple studies have identified the need to incorporate a psychological lens such as how people learn to effect knowledge transfer (Grant, 2011), the psychology of knowledge sharing (Paulin & Suneson, 2012), difficulties experts have codifying knowledge (Toukara, 2013), leadership, culture and people (Pawlowski & Bick, 2012), and conveying the context of knowledge into an individual's experience (Virtanen, 2013). Holmquest (2018) applied positive psychology to understand and identify the psychological characteristics that correlate to exemplary behaviors within a KMS, creating a foundation for researchers and practitioners to build upon.

Documented in this chapter, the researcher sought to replicate the study in (Holmquest, 2018). One of the challenges to the Holmquest (2018) study was that the participants in the study all worked for a single company. This was mitigated by the large number of responses used (1,075 participants) and the global diversity of the participants (Holmquest, 2018). This chapter seeks to replicate this study among the authors contributing to the chapters in this book. Specifically, the following research questions from (Holmquest, 2018) will be tested:

- Q1.** To what extent, if any, does an individual's positive emotion indicator as identified in the PERMA instrument correlate to the person's contributions as a knowledge worker within the context of a knowledge management system?
- Q2.** To what extent, if any, does an individual's engagement indicator as identified in the PERMA instrument correlate to the person's contributions as a knowledge worker within the context of a knowledge management system?
- Q3.** To what extent, if any, does an individual's relationships indicator as identified in the PERMA instrument correlate to the person's contributions as a knowledge worker within the context of a knowledge management system?
- Q4.** To what extent, if any, does an individual's meaning indicator as identified in the PERMA instrument correlate to the person's contributions as a knowledge worker within the context of a knowledge management system?
- Q5.** To what extent, if any, does an individual's accomplishment indicator as identified in the PERMA instrument correlate to the person's contributions as a knowledge worker within the context of a knowledge management system?

**Q6.** To what extent, if any, does an individual's overall indicator as identified in the PERMA instrument correlate to the person's contributions as a knowledge worker within the context of a knowledge management system?

## **Hypotheses**

The following hypotheses were offered and tested in (Holmquest, 2018).

**Hypothesis One:** There is a statistically significant correlation between positive emotions and being an exemplary participant in the KM program.

**Hypothesis Two:** There is a statistically significant correlation between engagement and being an exemplary participant in the KM program.

**Hypothesis Three:** There is a statistically significant correlation between relationships and being an exemplary participant in the KM program.

**Hypothesis Four:** There is a statistically significant correlation between meaning and being an exemplary participant in the KM program.

**Hypothesis Five:** There is a statistically significant correlation between accomplishments and being an exemplary participant in the KM program.

**Hypothesis Six:** There is a statistically significant correlation between the overall score and being an exemplary participant in the KM program.

In the original study, it was found that none of the null hypotheses could be rejected except for H5 and H6. The multiple regression test determined that there is a high degree of correlation between the Accomplishment element of the PERMA model as well as the overall PERMA score.

Replicating the study will help determine if the limitations in the original study remain valid. The goal of this research is to continue examining the behaviors and motivations of the users in a KMS. Using psychology-based theories to provide insight into users' motivations and behaviors will create new paths to improve the success rates of KM projects and initiatives.

## **BACKGROUND**

Knowledge management as a formal practice is relatively new. Knowledge management has its roots in the seminal work of Nonaka and Takeuchi. They determined that knowledge exists across a lifecycle of events (Nonaka & Takeuchi, 1995). During this lifecycle, knowledge is a dynamic entity passing through four processes within an organization: socialization, externalization, combination and internalization (Tzortzaki & Mihiotis, 2014), sometimes referred to as the SECI lifecycle. This lifecycle takes knowledge from the individual, through the organization and back again to the individual. As knowledge goes through the SECI lifecycle, knowledge is categorized into two forms. The first is known as explicit knowledge. Lay people are the most familiar and comfortable with explicit knowledge. Explicit knowledge is readily codified and easy to share. Whether it is knowledge in a research book, operations in a manual, recipes in a cookbook, or other written volumes, most in the workforce use explicit knowledge daily. Tacit (or implicit) knowledge is a bit harder to define. It is the know-how that the individual has gained through the benefit of experience. Some think of tacit and explicit knowledge as being a spectrum (Virtanen,

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2013). It has long been believed that much value is found in processing explicit knowledge, but that the real value falls into managing implicit knowledge.

Knowledge, in general, always has to have an implicit aspect because everything that a human learns is understood through the context of the individual's experiences (Virtanen, 2013). Our knowledge builds on other pieces of knowledge. Humans have knowledge building blocks that are used to identify, explore, and understand phenomena. To demonstrate the difference, consider the following: imagine the SECI lifecycle on the knowledge required to ride a bicycle. Describing how to sit on a bicycle, physically how to pedal, the concept of center of gravity, etc. can all be described in detail. The mathematical formulae to describe specific behaviors based on classic physics can be included. Those details can easily be codified, written down in a book for others to read, consume and understand. This is the explicit knowledge. But, even if one captured this knowledge 100% accurately and completely, the reader would most likely still not be able to ride the bicycle on the first try. Understanding something intellectually can represent the explicit knowledge. But a novice, benefiting from that explicit knowledge would have a very low probability of reading the knowledge, getting on a bicycle, and immediately riding off. The reason is the lack of the implicit knowledge that is required to put the explicit knowledge into practice. It's knowing what it feels like to be off balance; how to adjust to correct the center of gravity; and knowing and being able to feel the need to pedal faster because the loss of momentum is causing the bicycle to lean. All these things are deeply personal knowledge that requires experience to have truly learned it. That is the value of tacit knowledge.

Knowledge management is meant to bring organizations unprecedented business value by taking the knowledge of individuals and making it available to others in the organization. But most projects fail to produce the value projected within the first two years (Vanini & Bochert, 2014). And the majority are cancelled as failed projects (Vanini & Bochert, 2014). In 2012, the annual revenue for the KM market was \$157 billion according to the Knowledge Management: A Global Strategic Business Report (n.d.). With a success rate of only one in six KM projects driving value (Vanini & Bochert, 2014), that represents \$130 billion loss globally. There is a significant need to improve the success and value of knowledge management in organizations and as an industry. To date, the majority of research has focused on KM failures as IT problems (Erickson & Rothberg, 2014; Vanini & Bochert, 2014). But what is needed to increase the success rates of KM as a discipline as well as to begin to gain more value from the elusive implicit knowledge is to understand the psychology of the users of the KMS. Without that understanding, designers of KMSs are effectively learning through trial and error. Even when one is successful, the underlying reasoning for the success is missed, lacking understanding of what in the human minds that made it a success.

## **PSYCHOLOGY-BASED LENSES**

In the following sections two psychological theories are described, psychological contracts and positive psychology. It is proposed that using these theories KM practitioners can better understand the motivations of the users in the KMS. By understanding those motivations, the system can be designed to increase the probability of users adopting the needed behaviors. This will increase the likelihood of realizing the value intended by the KMS.

## **Psychological Contracts**

A relatively new theory in psychology is the psychological contract. A psychological contract is established between an individual and an organization (Rousseau, 1989). This contract is not an explicit artifact. In fact, the organization typically does not even know that it exists; it represents the unilateral beliefs of the individual (Rousseau, 1989). An example of this is demonstrated in the adage “a fair day’s work for a fair day’s wage.” An individual can have full belief in this concept. It can tie to some of the individual’s most core beliefs and provide motivation for many actions, consciously and unconsciously (Rousseau, 1989). But the employing organization never stated this. Unlike a legal contract, the terms of the contract are not explicit. And the fact that the terms are unilaterally decided upon and even hidden from one of the parties does not make it any less valid. The psychological contract is completely within the mind of the individual, yet it has more impact on the individual than the actual employment contract with the organization employing the individual.

Due to the deep connections to the individual’s belief system, these psychological contracts have been proven to result in stronger and result in more emotional responses when terms in the contract are violated compared to violations of actual contracts and terms explicitly in place between the individual and the organization (O’Donohue et al., 2007; Rousseau, 1989). In the case of real contract violations there are typically paths to remediation, but not so with psychological contracts. Therefore, violations of the psychological contract which tie to the individual’s core beliefs, and which the organization is not aware of, lack a means of remediation leaving the individual in contention and frustration (O’Donohue et al., 2007; Rousseau, 1989). The lack of remediation for a given offense that can be tied to very core value-based attributes of the individual can easily result in very powerful actions from the individual, while managers may be completely surprised and not understanding where the hostility is coming from due to the hidden nature of the psychological contract.

Based on this research, it is worth exploring whether this theory can provide insight into the users’ motivations and behaviors in KMSs. In this next section, psychological contracts are examined within the context of knowledge management.

## **Psychological Contracts and Knowledge Management**

The typical knowledge management project has a very low probability of success. Knowledge management projects fail at a rate between 50% and 70% (Li et al., 2016). Employees actively and passively refusing to adopt the desired behaviors largely account for these failures (Li et al., 2016). When examined through the lens of the psychological contract, twelve factors were found to violate individuals’ psychological contracts (Li et al., 2016). The study found correlations between loss aversion, transition costs and social norms. Discovering these beforehand by using psychological contracts, the KM practitioners could have dramatically increased the likelihood of success for these projects (Li et al., 2016).

In the typical KMS, most of the key users are subject matter experts (Mládková, 2011). They are the holders and creators of the most valuable knowledge that the system was created to retain, grow and distribute (Mládková, 2011). If a manager lacks the level of knowledge that a subordinate subject matter expert has and attempts to give prescriptive directions in the area of the individual’s expertise, it will result in a violation of the knowledge worker’s psychological contract (Mládková, 2011). This explains the negative performance evidenced in (Mládková, 2011). The manager most likely does not have aware-



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ness that this is even occurring. As a result, the working relationship between the knowledge worker and the manager can quickly erode without the manager recognizing or understanding it (Mládková, 2011).

With this understanding, it is easy to understand how implementing a KMS can similarly trigger a violation of the knowledge worker's psychological contract. Instead of the manager not having the same level of expertise, the organization is explicitly stating that it does not have the level of expertise across the workforce. Through the use of the KMS, this critical knowledge will be available to more of the workforce, which is highly valuable from an organizational perspective. But how does it align to the knowledge worker's psychological contract? Is there a reward that is of sufficient value to the individual to warrant sharing the knowledge that they learned through potentially years of experience and hardships and that makes them a unique and valuable asset to the organization? If not, the ask to contribute and participate in the KMS is a violation of the psychological contract. The deep connection to a person's beliefs is further explained using the psychological lens of positive psychology.

## **Positive Psychology**

As far back as Aristotle, Plato and Socrates, philosophers have offered that leading a virtuous life will result in authentic happiness (Hefferon & Boniwell, 2011). This concept of the "virtuous life" is the foundation of positive psychology. This is not the narcissistic or selfish psychology that was proposed in humanistic psychology (Hefferon & Boniwell, 2011). Seligman and Csikszentmihalyi defined positive psychology as the scientific study of subjective experiences of "well-being, contentment, and satisfaction (in the past); hope and optimism (for the future); and flow and happiness (in the present)" (Seligman & Csikszentmihalyi, 2000, p. 5).

After the horrors of World War II, psychology as a branch of science went through a transformation. Massive investments went to research that would fix the wrongs that people had (Huneycutt, 2013). This has led to very important and valuable work. It created the mental health industry that we have today. By focusing on the pathology of the human psyche, assets like the Diagnostic and Statistical Manual of Mental Disorders (DSM) have been created and refined. Sponsored by the American Psychiatric Association, the DSM defines mental disorders and corresponding treatments with scientific validity. But approaching psychology only from a perspective of freeing humans from mental disease also created a view of the science that only covers half of the psyche. In the view of most psychologists prior to positive psychology theory (Seligman & Csikszentmihalyi, 2000), having a healthy psychology meant being free of disease. Positive psychology explores the other half of the human psychological experience. What makes life worth living? What leads to happiness? What are human strengths? How can we maximize the human potential and not be satisfied with simply being free from mental disease?

One of the key contributions positive psychologists have brought to the science is the Character Strengths and Virtues: A Handbook and Classification (Peterson & Seligman, 2004), or CSV. This is the counterpart, not replacement to, the DSM. The DSM categorizes and defines the diseases that can affect the human mind. The CSV defines what is best in individuals and what makes life worth living (Peterson & Seligman, 2004). Understanding what human strengths are and the impact of using these strengths was the first step into developing positive psychology (Asebedo & Seay, 2015; Rashid, 2015).

## How to Measure Well-Being: PERMA

With positive psychology being the scientific study of well-being, a means to objectively measure well-being was needed. But well-being as a thing cannot be measured (Seligman, 2011). Well-being is a construct that is comprised of multiple factors. “The weather” is a similar construct. The weather, as an entity, cannot be measured. When we, in human-to-human conversation, say things like “the weather is good today,” it is generally understood what that means. But there is no scientific measurement to determine that the weather is good. However, there are many elements that comprise the weather that we can measure with scientific precision like wind speed, temperature, humidity and so on. These elements combine to create the construct of weather.

Similarly, well-being is comprised of five elements (Seligman, 2011). These elements comprise the PERMA model (Seligman, 2011). Each letter in the acronym represents one of the elements of well-being: Positive emotions, Engagement, Relationships, Meaning and Accomplishment (Seligman, 2011). Once these elements were defined and established, an instrument was needed to objectively measure these subjective facets. The PERMA survey was created and validated as the instrument to measure an individual’s well-being (Lambert et al., 2015). This model and instrument have subsequently been evaluated in multiple domains (Allen & McCarthy, 2016; Asebedo & Seay, 2015; Chou et al., 2013; Dattilo, 2015; Kern et al., 2015; Mills & Kreutzer, 2016; Shepherd et al., 2015).

Most recently, the PERMA model was evaluated by Holmquest as a means to predict users’ behaviors exhibited in KMS (2018). This study found a strong correlation between the overall PERMA score, with the Accomplishment element being the determinant factor (Holmquest, 2018). Juxtapose this finding to typical KM program communications. KM practitioners use appeals to users’ sense of community and helping the greater good of the organization as motivation to participate in the KMS. But, as examined in the previous section, the psychological contract is typically more aligned with the individual’s growth, experience and unique knowledge making them more valuable and thereby giving the individual a better sense of security. The Accomplishment correlating to the individual exhibiting the desired behaviors in a KMS demonstrates that the motivations of the individual are inspired by self-interest more than altruistic factors, which is the same findings as the psychological contracts of the KM worker (O’Donohue et al., 2007). Both theories help to explain why so many KM projects fail due to users’ resistance.

## REPLICATING THE STUDY

Holmquest pointed out that there are risks to the validity of his study (Holmquest, 2018). One of the limitations in (Holmquest, 2018) was that, while global and having a large sample, all of the participants were from the same company (Holmquest, 2018). This challenges the transferability of the findings because it could be that the participants could have a unique mindset or culture. In an attempt to replicate the study in (Holmquest, 2018), the contributing authors to this book were asked to take the PERMA survey. By replicating this study by having the contributing authors as study participants, that aspect of the limitations could be removed, the authors being from different organizations and contexts.

The survey was given to all contributing authors. Twelve provided their responses to the survey. In (Holmquest, 2018) the following description statistics were found:

The results of each PERMA score in this study were very similar. Looking at the individual elements of the PERMA model that compose a person’s well-being as well as the combined overall score, the 1,075

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Table 2. Descriptive statistics from (Holmquest, 2018)

	P	E	R	M	A	Overall
Mean	7.126202	7.406822	7.555659	7.324651	7.310388	7.355058
Standard Error	0.046368	0.044435	0.051017	0.05374	0.040667	0.038037
Median	7.333333	7.666667	8	7.666667	7.666667	7.5625
Mode	8	8.333333	8.333333	8.333333	7.666667	7.8125
Standard Deviation	1.520292	1.456904	1.672701	1.761994	1.333368	1.247118
Range	8	8.333333	9	10	7.666667	7.5
Minimum	2	1.666667	1	0	2.333333	2.5
Maximum	10	10	10	10	10	10
Count	1075	1075	1075	1075	1075	1075
Confidence Level (95.0%)	0.090983	0.08719	0.100104	0.105448	0.079796	0.074635

participants in the original study have comparable profiles to the 12 participants in this study. Therefore, it is likely that the results of this test would yield the same findings: a high degree of correlation between the Accomplishment score and the Overall PERMA score.

Unfortunately, the study could not be fully replicated. The variability of the dependent variable in the (Holmquest, 2018) study was determined by other questions in the survey distributed independent of the PERMA instrument. A score was determined based on the answers to these questions that indicated the level of participation that the individual subject has with respect to the KMS in place. In this study, the only indicator of behavior is the fact that the individual is a contributing author. Therefore, a statistical regression test like ANOVA that was used in (Holmquest, 2018) failed to produce valid insight because there was a lack of variations in the dependent variable.

However, an additional question was given to the contributing authors that resulted in interesting responses that do provide insight. The question was “What is your primary motivation for contributing a chapter to this book?” These responses were categorized into three categories. First are vague

Table 3. Descriptive statistics from contributing authors study

	P	E	R	M	A	Overall
Mean	7.083333	7.777778	7.5	7.777778	7.166667	7.453125
Standard Error	0.418682	0.257328	0.425413	0.406871	0.321769	0.295977
Median	7.5	8	7.166667	8	7.333333	7.90625
Mode	8	8	6.666667	8	8	#N/A
Standard Deviation	1.450357	0.891411	1.473675	1.409444	1.114641	1.025293
Range	4.666667	3.333333	4.666667	6	3	3.4375
Minimum	4	5.333333	4.666667	4	5.333333	5
Maximum	8.666667	8.666667	9.333333	10	8.333333	8.4375
Count	12	12	12	12	12	12

answers that did not given insight into motivations (e.g., no response or responses that did not answer the question). Second are answers that showed selfish interests (e.g., to get a promotion, increase my reputation). And the third category aligned to answers of an altruistic nature (e.g., to advance the state of art for knowledge management practitioners everywhere). The majority (66.6%) fell into the second category of selfish motivations.

While a statistical validation of the findings from (Holmquest, 2018) could not be determined by this replication, the findings that 66.6% of the contributing authors participated for selfish reasons does align with the finding that Accomplishment correlated with exhibited behaviors in the KMS. It also validates the findings of the psychological contract of the KM worker (O'Donohue et al., 2007). Therefore, it reinforces the previous findings that using both positive psychology and psychological contracts theories to understand and predict users' behaviors in the context of a KMS is a scientifically valid approach.

Furthermore, one could challenge the statistical validity of a population of just 12. However, the number of study participants in (Holmquest, 2018) is one of the studies strengths. The original study has 1,075 participants with worldwide representations (Holmquest, 2018). The value in replicating this study is in testing the limitations presented in (Holmquest, 2018). While the data collected failed to provide enough information to allow for statistical analysis via one-way analysis of variance (ANOVA) as a means to test the null hypotheses. However, what we see in the descriptive statistics of the results from this study and the original are similar results. And the qualitative answers to the surveys do show alignment with the findings in (Holmquest, 2018). Therefore, the researcher concludes that this study does support the findings in the original study.

The findings support that users of KMS participate when it is believed that it is directly in their benefit to do so. Altruistic motivations like “contributing your knowledge will help others in the community to achieve more” at best fail to motivate the users and at worst inspire user to withhold their knowledge. This finding is contrary to the “common knowledge” set of assumptions around KM. Therefore, the significance of this is fundamentally important. It has broad implications for how KMS are designed and how adoption efforts are constructed.

## **SOLUTIONS AND RECOMMENDATIONS**

Knowledge management systems and knowledge management as a discipline are designed with value for the organization as well as the individual. The willingness of the users to participate in the KMS or knowledge management initiatives determine the success or failure of those efforts. Organizations need to put as much effort into understanding their users as they do assessing and understanding the technology used to implement the system. With psychological contracts and positive psychology as lenses into understanding the psychology of the users, knowledge management efforts could dramatically increase their success rates. Even when a new system or feature does result in failure, using a psychology-based lens to assess the human aspect of the problem will lead to greater understanding.

The theory of psychological contracts shows that the typical knowledge worker views the value that they represent to the organization stemming from the *unique* knowledge that they hold. When told that documenting this knowledge by placing it into the KMS will help democratize that knowledge to the betterment of the organization as a whole is only a positive motivator when there is a direct, explicit link to their performance and rewards. Here are some key excerpts from the verbatims of the survey when asked “What is your primary motivation for contributing a chapter to this book?” that illustrate this finding:

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- Career development
- Quota of publications required by employer
- Career advancement
- My dissertation deserves to see the light of day

In the original study, it was found that an individual's overall PERMA score highly correlated to their participation in KMS with high confidence (Holmquest, 2018). When looking at the individual elements that make up the PERMA model, only the element of Accomplishment correlated to participating in KMS. Analyzing the verbatims shows that 66.6% of the participants said their primary driver for participating in this effort to codify knowledge was primarily motivated by selfish factors. This aligns with the findings that Accomplishment predicts a user's behavior in a KMS. And only 16.6% cited altruistic motivations like helping the community, without personal gain.

When the organization has a better understanding of the psychology of users of the KMS, the organization will have the opportunity to use this knowledge to better communicate to its users and design the KMS more effectively to produce a higher probability of success in its change management efforts. Knowing the actual motivations of the users, the KMS can meet the users' psychological needs which in turn will encourage the use and adoption of the KMS. For example, knowing that Accomplishment from the positive psychology lens and enhancing the individual's reputation from the psychological contract lens, the KMS can be designed to emphasize the contributions of the individual. Therefore, the first recommendation is that KM professionals invest in understanding positive psychology and psychological contracts with respect to KM programs. Having this as background can help change the course of implementations as well as communications. It can also lead to better interactions with users of the system. All of which will increase the likelihood of success of the KMS.

Often the first things that is created when an organization decides to begin its KM journey is a knowledge repository (Toukara, 2013). The findings of these two studies suggests this as an initial step, by itself, is likely to be a mistake. Therefore, a second recommendation is, as part of designing the repository, the KM practitioners should put some importance into emphasizing the individual's contributions and facilitate building the individuals' reputations both to providers and consumers of the knowledge. KM practitioners will need to understand the culture of the organization for which they are building the KMS. Psychological contracts theory shows us that organizations that have a culture that rewards individual achievement will have a very difficult time getting users to contribute to the group knowledgebase. Understanding this up front is critical to the success of the KM effort. When a significant percentage of the user base has in their psychological contract that what is rewarded and valued is their unique knowledge, creating a knowledge repository where people can share their knowledge as a first step has a very low probability of success. This research shows the criticality of aligning the culture and mindset of the individuals in an organization to include performance evaluations and rewards to the goals that the KM program is meant to fulfill. Without this explicit alignment, it is doubtful that users will exhibit the behaviors in the KMS necessary to meet those goals.

### **FUTURE RESEARCH DIRECTIONS**

Both the study in this chapter as well as (Holmquest, 2018) provide quantitative evidence that using the psychology-based theories of positive psychology and psychological contracts can be effectively used

to understand and predict the behaviors of the users in a KMS. This new knowledge opens some new research possibilities. First, as proposed in the previous section, when implementing new features or systems in KM programs, the practitioners can use this knowledge to better design for the users. This can be tested to determine what the impact of incorporating these lenses have, if any. From that, new frameworks and methodologies of implementing and operationalizing KMSs can be standardized. This will bring greater value to the overall KM community and should increase the probability of success of KMSs.

Another area for potential future research would be to determine the causality of these correlations. In particular, going further into specifics of the average KM worker's psychological contract. A deeper understanding of individuals' psychological contracts could lead to treatments that would increase the success rates of implementing KMSs. It could also lead to new ways to implement KMSs or facets thereof. In the past, KM problems have been treated, largely, as IT problems. Continuing this line of research can help broaden that limited view by expanding from just an IT problem into incorporating the human component of these systems.

## **CONCLUSION**

In this chapter, the motivations and psychology of the users were explored through the psychology-based lenses of positive psychology and psychological contracts. These theories have demonstrated that the average user of a KMS is motivated more by selfish factors like reputation building and personal rewards than via more altruistic factors like increasing organizational value. Knowing this, KM practitioners have an opportunity to positively impact the adoption of the KMS. Ironically, KM practitioners frequently use altruistic themes to inspire users to specific behaviors in a KMS. Such efforts could actually increase the resistance of adoption according to psychological contract theory. With only one in six KM initiatives realizing value within the first two years and the majority being abandoned as failures (Vanini & Bochert, 2014) resulting in billions of dollars globally being wasted, the KM community needs to look for answers to these short comings. Researching users from a psychological perspective is needed. The few studies conducted on incorporating a psychological lens, including the one in this chapter, have demonstrated value with scientific validity. KM practitioners need to put this knowledge into practice and share the results. In effect, KM practitioners need to apply knowledge management principles to bring these psychology-based tools to realizing value.

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## **KEY TERMS AND DEFINITIONS**

**Accomplishment:** Accomplishment is completing something that results in a connection to meaning for the individual. The accomplishment does not necessarily have to be something practical. And the meaning is completely subjective to the individual. For example, I really enjoy auto racing. Every lap that I do that is at a certain level of performance (and that level shifts depending on several variables) I get a sense of accomplishment. The meaning that I attach to this accomplishment is one of personal excellence. Other examples include but aren’t limited to achieving a milestone like course completion, learning a new skill, breaking a new physical limitation barrier, joining a social club. Anything that the individual values and comes to a sense of having reached a new level.

**Engagement:** Engagement is the psychological state of flow. This state is experienced when the individual is engaged in a task or activity and becomes so emerged in the activity that time passes without notice.

**Knowledge Management System (KMS):** KMS, for this chapter, is a loosely defined term referring to all of the components used by an organization to achieve their knowledge management goals. Components include physical and virtual assets as well as conceptual. And most importantly for this

discussion, the KMS includes the users of the system in all their forms (for example: administrators, regular users, subject matter experts, etc.).

**Meaning:** Meaning is very subjective. The individual assesses that his/her contribution is having an impact in reaching goals beyond ones' own life. This can be represented in religious concepts, but not necessarily. For example, participating in a protest against a social injury can give the individual a sense of meaning by connecting to a higher authority or simply by feeling a sense of justification in trying to change society.

**Positive Emotion:** Positive emotion is the subjective emotional interpretation of the past, present and future.

**Positive Psychology:** A branch of psychology that represents the scientific study of well-being, hope and flow.

**Psychological Contract:** The implicit contract between an individual and an organization that unilaterally represents the individual's beliefs with respect to the relationship between the individual and the organization. It is important to understand that this is a unilateral agreement. The organization has no direct knowledge of this agreement. It is purely defined in the mind of the individual. And often, the individual is not consciously aware of the elements of the psychological contract. A typical example is "I expect the organization to value and reward my hard work based on the impact it has." There are many examples of such "agreements" that each of us has with organizations to which we belong.

**Relationships:** Relationships are the positive relationships that the individual has that are healthy and lead to positivity in one's life.

## Chapter 2

# Knowledge Sharing in a Digital, Remote, and Disrupted World: The Role of Trust

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### **ABSTRACT**

*Trust is a critical element when building knowledge management practices within an organization. For individuals and teams to share knowledge and collaborate, they must form a relationship that is based on trust. The role of trust within knowledge-sharing, and therefore collaboration and cooperation, will be discussed. In a multinational, distributed, remote work environment, colleagues will interact with content created by their peers before they interact with them, and therefore, digital repositories and content become an extension of the trust relationship between colleagues and even the organization itself. The trust required to facilitate knowledge-sharing will need to be extended to these digital environments so that the organization can maintain its competitive advantage and the benefits of effective knowledge management practices.*

### **INTRODUCTION**

Organizations implement knowledge management activities to drive organizational efficiency, innovation, and performance (Davenport & Prusak, 1998). For these activities to be successful, it will require that individuals and teams are able to share knowledge. Activities such as creating and sharing knowledge and using others' knowledge will require communication, cooperation, and collaboration. Without a healthy dose of trust, such interdependent tasks are doomed to fail. An internal lack of trust within an organization can also bleed externally and damage relationships with customers, stakeholders, and the public, resulting in disastrous results for an organization (Hurley, 2019; Wzorek, 2021). One of the critical ways organizations can build trust with employees is to share knowledge regularly (Zak, 2007). Trust and knowledge sharing have a symbiotic relationship for organizational performance, and both are heavily influenced by the organization's culture (Conley & Zheng, 2009; Ling, 2011). Organizations that

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have built a high-trust culture see positive results such as greater productivity, collaboration, innovation, and higher employee retention (Zak, 2007; De Cremer, 2020). Leadership plays an influential role in building trust within teams and reinforcing positive knowledge-sharing behaviors; furthermore, teams that share knowledge benefit from better team performance (Lee et al., 2010). To remain successful in a period of significant disruption, organizations will need to strengthen both their trust-building and knowledge-sharing capabilities.

As organizations worldwide adapt to new ways of working brought on by the Covid-19 pandemic, many will need to find new ways to share knowledge as workers move from in-office to remote and distributed. While many organizations were using information communication technology in-office, the move to a completely remote workforce accelerated many organizations' digital transformations (Drenik, 2020; Lund et al., 2020) and changed the way workers were used to working with each other. Even though there was a great need to implement new methods of collaboration and connection, employees still struggled to adopt new technologies (Drenik, 2020). While there have been struggles, organizations are also seeing benefits to this new way of working, and many are believing that it is the way of the future (Sawatzky & Macrae, 2020; Lund et al., 2020, Choudhury & Salomon, 2020). Organizations are evaluating hybrid models where workers can spend a certain percent of the time at home or in the office alongside a more permanent remote model (Sawatzky & Macrae, 2020; Lund et al., 2020). This shift in how a considerable portion of the workforce engages in their work will impact organizational culture and interpersonal trust between employees.

Trust is created over time through multiple interactions (Singh & Srivastava, 2009). For remote or hybrid models to be successful, remote workers must be trusted by their peers and managers (Sawatzky & Macrae, 2020). However, in a remote environment, many of the ways we create trust are challenged due to a lack of physical proximity and less frequent social discussions (Mortensen & Gardner, 2021). Building trust in a remote environment brings about new challenges, and so trust will need to be built not only with individuals and teams but also with new digital environments, knowledge repositories, and digital content. In a remote environment, individuals will interact with the content that the person creates before they interact with this person, and so the content will become an extension of how individuals build trust with each other. Not only will organizations be challenged in this new way of building trust, but individuals will also have to overcome their habits and preconceived notions of how to build trust. Historically, remote work was seen as a perk for senior management (Gallacher, 2020). Many workers worried that they would hurt their careers if they were not in the office (Sawatzky & Macrae, 2020), and so individual perceptions of remote work will need to change to better support this type of work in the future.

This chapter aims to define the role of trust within knowledge-sharing and examine the different organizational culture factors that influence building a culture of trust where knowledge is shared effectively and leveraged by workers. Potential solutions and recommendations are proposed for how to build trust to enable knowledge-sharing between individuals and teams, and the role of leadership will be discussed. Given the drastic changes to the workforce brought on by the Covid-19 pandemic, creating digital trust amongst employees to enable knowledge-sharing in a new reality of more remote work will also be explored.

## **BACKGROUND**

### **Defining Trust**

Trust is a complex topic. It is often defined as a set of beliefs and expectations, and these different components constitute “trust” or a person’s willingness to trust. There is a decision-making process that each individual goes through and different factors may be more or less important depending on the individual (Hurley, 2006). Trust manifests itself in relationships (Schoorman et al., 2007) that develop over time (Singh & Srivastava, 2009; Evans et al., 2019). An individual’s tolerance for risk will play an essential part in their decision-making process for who and when to trust (Schoorman et al., 2007; Hurley, 2006). From a neurological perspective, two qualities allow humans to trust. First, humans can hypothesize what someone else’s actions might be, and second, humans can empathize with others’ emotions. These two qualities become the building blocks of analyzing others’ behaviors and establishing an expected pattern of behavior for the other party, which is crucial when building trust (Zak, 2019). This ability to predict what others might do enables individuals to interpret what actions are being taken, why they are being taken, and whether they will continue. Predictability is the basis for forming trust in others (Mortensen & Gardner, 2021). For a high trust relationship to occur between individuals, each party requires information about each other – without this information, trust cannot occur.

When examining how individuals decide to trust, there are some common factors. A few different definitions are provided as an example, but essentially, trust does not exist without a certain level of risk, and there are patterns of behavior that individuals will trust with this risk more often than others. McKnight et al. (1995) define trust as “one party’s willingness to depend on the other party with a feeling of relative security even though negative consequences are possible” (p. 9). Their definition emphasizes that one party relies on another to do something, and there will be negative consequences if this action occurs. The individual believes that the other person will act positively towards them, and they believe that this person is benevolent, honest, competent, and can be relied upon to do what they agreed to do. Mishra’s (1996) definition is similar. However, it highlights the factors that enable trust to be built: “one party’s willingness to be vulnerable to another party based on the belief that the latter party is 1) competent, 2) open, 3) concerned, and 4) reliable” (p. 5). This definition requires that one individual has evaluated the other. Their vulnerability indicates they are at risk of negative consequences should the latter party not accord with how the individual expects the latter party to act. Singh & Srivastava (2009) found that definitions of trust should include an element of risk for the individual and that the act that is requiring trust is a meaningful action. Meaning that if the other party does not act by how they have been trusted to act, there will be negative repercussions for the individual. Hurley (2006) defines trust as “confident reliance on someone when you are in a position of vulnerability” (para 3). Lastly, Mayer et al. (1995) define trust as “willingness to be vulnerable to another party, but there is no risk involved with holding such an attitude. Trust will increase the likelihood of RTR [risk taking in a relationship], which is the behavioral manifestation of trust” (p. 726). Risk-taking in trust is often described as being vulnerable to another person, either within a transaction or a relationship.

As individuals get to know each other better, trust will develop, and relationship norms and expectations will emerge and strengthen trust in the relationship (Singh & Srivastava, 2009). In the relationship, each individual will evaluate specific characteristics and determine where and when they will trust the other party. Competence is often mentioned in the literature as an important characteristic for developing trust (Mishra, 1996; Singh & Srivastava, 2009; Hurley, 2006; Abrams et al., 2003; Mortensen &

Gardner, 2021); one needs to demonstrate that they have the knowledge or skill required for the task at hand and that they will be successful in accomplishing this task. Another critical characteristic is predictability, or a consistent pattern of behavior so that individuals can feel confident that expected behavior will occur again in the future (Mishra, 1996; Singh & Srivastava, 2009; Hurley, 2006; Abrams et al., 2003; Mortensen & Gardner, 2021). Believing an individual will be benevolent in their actions is often required to build trust (McKnight et al., 1995; Abrams et al., 2003; Schoorman et al., 2007; Levin et al., 2004); this means that this person is believed to be acting with positive and well-meaning intentions. Integrity was another measure often mentioned in the literature (Evans et al., 2019; Schoorman et al., 2007; Hurley, 2006); individuals will trust others who appear to be acting with similar values and standards as their own. Similarly, each individual will measure whether their interests are aligned with each other, and highly aligned interests are a predictor of trust. Regardless of how many of these factors exist, individuals will be less likely to trust others when a high amount of risk is determined. Ultimately, high trust is the sign of a high-quality relationship (Hurley, 2006).

## **Digital Trust**

Trust is often discussed between individuals, but as more employees work remotely and interact with digital systems, it will be critical to understand how trust extends to individuals via digital systems and how individuals develop trust with digital systems. System trust is defined as “the belief that proper impersonal structures are in place to enable one to anticipate a successful future endeavor” (McKnight et al., 1995, p. 12). These impersonal structures are measures that enable the individual to expect another party is likely to act in a certain way, and they are a method of controlling the amount of risk an individual has to take to engage in the system (Schoorman et al., 2007). These structures can look like contractual agreements, rules, or other indicators such as common roles and responsibilities (McKnight et al., 1995). By having these structures in place, individuals can predict how other individuals in the system will behave. Technology can build system trust by enabling certain factors such as verification or feedback mechanisms to ensure users comply with regulations and trust is maintained (Honda & Kotaka, 2020; McNeish & Mann, 2010). Having a well-trusted system can speed up communication and knowledge sharing, enabling interpersonal trust and system trust (Honda & Kotaka, 2020). For employees to effectively share knowledge in a remote environment, system trust will be required.

When examining trust between individuals and technical systems, the most important outcome is action (Chakravorti et al., 2021). If an individual engages with the system and completes tasks with it, this indicates that the system is being trusted. If users are abstaining from interacting with the system, they may not trust the system. Sometimes users abstain from interacting with a system due to excessive friction; this could be requiring a new password or other technical blockers that prevent the user from engaging in the system. However, certain types of friction may be essential to protect the user, such as how a password protects users’ privacy. Ensuring the friction is for the user’s benefit and not due to a lack of design will ensure users build trust with the system and continue to use it (Chakravorti et al., 2018). Users are engaging in behaviors that would have previously been highly questionable, such as rideshare apps enabling passengers to ride with strangers. These sharing apps, such as Uber, Airbnb, and eBay, are all enabling users to exchange goods or services with strangers, and they have built trust with users by building complex systems that enable strangers to build trust with each other quickly (Tanz, 2014; Honda & Kotaka, 2020). By connecting user profiles with other social media profiles and requiring a user’s credit card, the system can determine bad actors by having strong feedback loops from the

other users. This feedback loop builds long-term trust with users by ensuring they have more positive experiences than bad experiences. However, when systems are too invasive, and users feel they are losing control, this can have the opposite effect and deplete system trust (McNeish & Mann, 2010). While consumer products and business products are often treated differently in the marketplace, there is much that business products can learn about how these consumer products are building trust with users and how these methods can enable better behaviors such as knowledge-sharing.

## **Knowledge Sharing**

Knowledge sharing is a crucial part of any organization's knowledge management strategy. It is defined as the delivery and receipt of relevant information, experience, or feedback (Mooradian et al., 2006; Bartol & Srivastava, 2002) or, more specifically, "the exchange of explicit and tacit knowledge relevant to team task" (Lee et al., 2010). It is most effective when individuals are motivated to help each other (Singh & Srivastava, 2009), requiring regular communication and interaction (Lee et al., 2010). Other scholars identify that knowledge-sharing must enable an action to be taken based on the knowledge (McNeish & Mann, 2010). Furthermore, knowledge-sharing occurs through social interaction where a shared understanding is built (Dalkir, 2011). The type of knowledge being shared may influence the outcome and efficacy of knowledge sharing (Mooradian et al., 2006). It is often stated that explicit knowledge is more accessible to share than tacit knowledge (McNeish & Mann, 2010). Knowledge sharing can occur from person to person and by leveraging digital technology and storing it in a knowledge repository.

Effective knowledge-sharing is linked to positive organizational outcomes such as increased productivity, innovation, and learning (Mooradian et al., 2006; McNeish & Mann, 2010). Teams with high trust will communicate more openly and be more open to trying new ideas (De Cremer, 2020), and these are both crucial elements for knowledge-sharing. These positive organizational outcomes are achieved when individuals share both their successes and failures, and an organization's culture will enable individuals to do this without fear (McNeish & Mann, 2010). Certain organizational factors may influence knowledge-sharing such as recognition, rewards, and incentives (Mooradian et al., 2006). While many organizations may want their employees to share knowledge, the organization will not see the intended results if the practice is not implemented well within the culture and not supported by trust.

## **THE CONNECTION BETWEEN KNOWLEDGE SHARING AND TRUST**

Without a solid foundation of trust, the individual will not naturally engage in knowledge-sharing (Singh & Srivastava, 2009). Knowledge-sharing can be a challenging process for individuals; the individual may doubt their knowledge and be fearful of looking inadequate or potentially misleading others, or they may doubt the relationship with the other party and fear their knowledge may be used against them or it may damage their own personal interests (Mooradian et al., 2006; Trees & Harper, 2020). Employees may be concerned that knowledge is being captured to prepare for downsizing or outsourcing and that their employment is at risk (O'Dell & Hubert, 2011; McNeish & Mann, 2010; Ling, 2011). This behavior of not sharing knowledge to retain a perception of power is called knowledge hoarding (O'Dell & Hubert, 2011). A lack of transparency and a lack of accessible information will prevent knowledge-sharing (McNeish & Mann, 2010). If previous knowledge management initiatives have failed, employees may be reluctant to trust new knowledge-sharing initiatives (Trees & Harper, 2020). Interpersonal trust assists

these challenges in being overcome, decreasing the costs of knowledge-sharing (Singh & Srivastava, 2009; Abrams et al., 2003). Transparent and supportive messaging from the organization about the intention of knowledge-sharing will be critical to building trust with employees.

Effective knowledge-sharing in the workplace relies on interpersonal trust (Mooradian et al., 2006; Mayer et al., 1995; Abrams et al., 2003; Singh & Srivastava 2009; Levin et al., 2004). Knowledge is created through social relationships (Nahapiet, 1998; Abrams et al., 2003), and trust is created through regular social exchanges between employees (Singh & Srivastava, 2009). Even when robust knowledge repositories exist, many employees will prefer to get knowledge and advice from their co-workers (Abrams et al., 2003). Individuals who interact regularly will often have a lot of the same knowledge, and so individuals who interact less frequently will have more valuable knowledge to share (Levin et al., 2004; Evans et al., 2019). Individuals are more motivated to provide helpful knowledge to each other when trust exists, and others are more open to receiving this knowledge when trust exists (McNeish & Mann, 2010; Lee et al., 2010; Abrams et al., 2003). When employees work together over a period of time, this can enable trust to occur (McNeish & Mann, 2010; Evans et al., 2019), but other important elements will be required to ensure trust is built.

As mentioned earlier in the chapter, individuals make a decision to trust based on different factors. In an organizational context to enable knowledge-sharing, it was found that individuals will evaluate both the individual's benevolence and competence when deciding to trust (Abrams et al., 2003; Levin et al., 2004; Evans et al., 2019). These two behaviors match with the previously discussed definitions of trust. However, it was also found that those trusted for their knowledge are seen to be discrete, reliable, communicative, and make fair and transparent decisions (Abrams et al., 2003). Requesting advice or asking a question can generate feelings of vulnerability, and so believing the other party is benevolent eases the fear of potential embarrassment, and believing the other party to be competent ensures this is a worthwhile endeavor (Abrams et al., 2003). In knowledge-sharing, it was found that believing the other party is competent is crucial to building trust, and this type of trust could be developed even in infrequent or limited interactions (Levin et al., 2004). Assessing the other party's integrity in knowledge-sharing was also found to be necessary; values alignment, consistent behavior, and positive feedback from others all contributed to integrity-based trust that ameliorated knowledge-sharing (Evans et al., 2019). When transferring explicit knowledge, competence-based trust was less important as explicit knowledge is typically easier to verify. Competence-based trust was more important in tacit knowledge transfers since this knowledge is more experiential and less easy to verify (Levin et al., 2004; McNeish & Mann, 2010; Evans et al., 2019). When knowledge is not easy to verify, the presence of trust enables knowledge to be accepted without extra verification (McNeish & Mann, 2010). Benevolence-based trust was important for both tacit and explicit knowledge transfers (Levin et al., 2004). Regular social interaction will facilitate the transfer of tacit knowledge since transferring tacit knowledge is a social process (Janowicz-Panjaitan & Noorderhaven, 2009). Since, as discussed earlier, trust develops over time, as the relationship is formed and develops, and more trust is built, more knowledge will be shared (Evans et al., 2019).

When organizations go through digital transformations, they typically will enhance their information communication technology, and many will implement electronic knowledge repositories to facilitate digital knowledge transfer. Sharing knowledge in a repository will require the same type of trust as sharing knowledge face-to-face; individuals need to feel safe parting with their knowledge, and they must trust the other contributors to use the knowledge in the system (Kankanhalli et al., 2005). Furthermore, individuals need to be confident in their abilities and knowledge to contribute to the knowledge reposi-



tory (Kankanhalli et al., 2005). Since there is less clarity for the knowledge contributor about who will use their knowledge and how it might be used, the organization must invest in a knowledge-sharing culture to fill these gaps (Kankanhalli et al., 2005; O'Dell & Hubert, 2011). The repository needs to be designed with minimal friction to ensure it is easy to retrieve and submit knowledge (Kankanhalli et al., 2005; Chakravorti et al., 2018). Learning how to use this system will not be enough to garner adoption; transparent and supportive messaging will also be required for users to build trust with the system.

## **ORGANIZATIONAL CULTURE, KNOWLEDGE-SHARING, AND TRUST**

O'Dell and Hubert (2011) say “trust is not spontaneous” (p. 97). Trust must be built intentionally, and organizational culture will play an essential part in building interpersonal trust, trust between individuals and the organization, and effective knowledge-sharing behaviors (McNeish & Mann, 2010; Ling, 2011). Organizational culture can be defined as a “shared product of shared learning” (Schein, 2017, p. 50). This learning happens between individuals, and they form a collective where group norms will persist even as some members leave the organization and new members join. Many of these norms will indicate a culture that is “high trust” or “low trust.” Trust is a crucial element for an organization’s endurance and long-term success (Mishra, 1996). One of the benefits of a high trust culture is that teams and individuals openly share knowledge, leading to better performance (Zak, 2007; Lee et al., 2010). Teams that share their knowledge demonstrate better decision-making, improved problem solving, higher quality outputs, better customer satisfaction, and more creativity (Lee et al., 2010). The organization’s leadership team plays a crucial role in establishing and reinforcing knowledge-sharing within the culture (Lee et al., 2010). Different countries may have different cultures and established practices for knowledge-sharing (Moordaian et al., 2006), and so the macro culture of the organization will also influence the results of knowledge-sharing. Organizational culture will influence trust and knowledge-sharing behaviors, and a high-trust culture will improve knowledge-sharing capabilities since knowledge-sharing and trust are so connected.

Trust is crucial for collaboration between individuals and between groups (Mishra, 1996), and collaboration is essential for knowledge-sharing. Individuals working in groups need to trust that they can rely on each other and feel comfortable sharing sensitive information (Lee et al., 2010). When individuals and groups trust each other, they engage in more cooperative behavior, conflict is minimized, and they are more likely to help each other (Mishra, 1996; McNeish & Mann, 2010; De Cremer, 2020). The more the group cooperates successfully, the more trust is created, which further creates more trust (Nahapiet, 1998). High performing groups are those that have high trust in each other (Singh & Srivastava, 2009; De Cremer, 2020). Within a cooperative group, if there is a person of authority, they may have an easier time trusting others since they will have recourse if their trust is violated. In contrast, individuals who do not have that same authority may not be as quick to trust as they are more vulnerable (Hurley, 2006). The organization’s culture will significantly influence the behaviors that effectively build collaboration.

Knowledge-sharing enables organizations to capture critical knowledge that will provide them with a competitive advantage, and organizational culture plays a vital role in this activity (McNeish & Mann, 2010; Conley & Zheng, 2009). For individuals to feel comfortable sharing their knowledge, they must be incentivized appropriately through a supportive environment (McNeish & Mann, 2010; Ling, 2011). The individual needs to trust that their knowledge will be used appropriately and that there is reciprocity for knowledge-sharing within the culture (Ling, 2011; Lee et al., 2010). If individuals see knowledge

being misused within the culture, they will be less likely to share their knowledge or use the knowledge others share (Ling, 2011). Individuals that are highly aligned with the organization's mission will be more inclined to share their knowledge if they believe it will be helpful to the organization (Kankanhalli et al., 2005; Abrams et al., 2003). Employees may perceive that knowledge should only be shared with senior leadership and not with peers or employees in other teams. They may believe that cross-functional groups do not share their values or standards and will not take knowledge or input from them (O'Dell & Hubert, 2011). If the team leader communicates and shares knowledge openly and transparently, this will motivate the other team members to do the same (Lee et al., 2010). Rewards and recognition that support individuals in building their expertise and competence are more likely to influence knowledge-sharing positively (Bartol & Srivastava, 2002). For employees to use the knowledge shared with them, they must believe it is accurate and up-to-date and that the source of the knowledge is benevolent (Trees & Harper, 2020). If the knowledge is in a knowledge base, it must be clear when the knowledge was created and who created it to be trusted; duplicate content or disorganized content will also diminish trust (Trees & Harper, 2020).

Highly competitive environments will negatively impact trust and knowledge-sharing (Edmondson, 2015; Delizonna, 2017). If individuals believe that their success depends on someone else's failure, this will create unhealthy competition, challenging collaboration, and teamwork efforts. Individuals will be less likely to share knowledge because they will not want to help their teammates (Edmondson, 2015). High amounts of conflict, especially creating a blame culture, will prevent individuals from feeling like they can trust their co-workers, and performance will suffer (Delizonna, 2017). Employees who do not feel comfortable sharing their mistakes, challenges, or weaknesses will prevent teams from building trust (Lencioni, 2002). This lack of trust negatively affects team performance, and it also wastes time as employees are constantly protecting their image or overly massaging their communications (Lencioni, 2002). These environments are often created unintentionally due to a lack of self-awareness from leaders. Leaders can also cause them under significant pressure to meet performance targets (Brower et al., 2017). Furthermore, organizations can often benefit the most from learning from their failures, and so if these are not shared, the organization is significantly disadvantaged.

## **REMOTE WORK CHALLENGES TRUST-BUILDING**

Organizations worldwide went through either temporary or permanent transitions brought on by the Covid-19 pandemic. Many of these organizations needed to embrace a work-from-home model when they had no experience with this previously. Some organizations resisted enabling work-from-home models due to a worry that productivity would decline and that workers could not be trusted to work unsupervised (Wzorek, 2021). Managers were worried about their abilities to supervise remote workers, and many held pre-existing beliefs that remote workers do not perform as well as those in-office (Parker et al., 2020). However, when workers transferred to home in many cases, productivity stayed the same or improved (Wzorek, 2021). Many workers believed they were more productive at home than in the office (Lund et al., 2020). Regardless, many organizations struggled to adapt to having employees out of sight. Managers that could not "see" their team members had difficulties trusting that their employees were working and imposed different expectations and rules, which in turn increased stress and lowered work-life balance (Parker et al., 2020). Organizations implemented more controls to monitor employees at home, signaling a lack of trust in employees (De Cremer, 2020; Mortensen & Gardner, 2021). Monitoring systems

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where employees are required to log their time, their tasks and are monitored through regular digital photos taken by their webcam are examples of the additional controls employers implemented to ensure employees truly worked at home (Mortensen & Gardner, 2021). When systems are designed to reduce risk, one cannot assume compliance with the system is genuine trust. These control systems remove the ability for employees to build trust with each other and with the organization (De Cremer, 2020). Additional controls hurt the organization in other ways; employees are less creative and adaptable (Esser, 2021). Furthermore, being under surveillance increases anxiety amongst employees, leading to burnout and lower engagement (Mortensen & Gardner, 2021); another study showed monitoring led employees to believe they were not trusted (Parker et al., 2020). While some organizations experienced positive results with remote, these experiences were not universal. The way remote work was implemented was inconsistent due to organizations with high or low trust in their employees.

Individuals also have challenges building trust since working remotely deprives teams of observational data about each other; they have fewer casual conversations and less opportunity for informal cooperation or collaborations (Mortensen & Gardner, 2021). Acts of everyday kindness such as opening the door for someone or helping someone carry a heavy bag to their car can foster trust. Teams that do not get these opportunities will have less data to form their impressions of their co-workers, and therefore building trust will suffer. When individuals require proof before trusting, this may make it more challenging to build trust between employees in remote environments (Mortensen & Gardner, 2021). As trust struggles to be built in remote environments, it can also make it more difficult for employees to share knowledge. One of the most important relationships an individual will have at work is with their supervisor, and this relationship also suffers in a remote environment. Employees who work remotely were found to believe that their manager does not trust their abilities or expertise (Parker et al., 2020). This lack of trust negatively impacts both the employee experience and their productivity.

## **SOLUTIONS AND RECOMMENDATIONS**

### **High-Trust Cultures**

Organizations that invest in building a high-trust culture will enable knowledge-sharing and see better performance (Lee et al., 2010). Many elements make up a high-trust culture; these elements must be built deliberately and maintained over time. A clear mission, goals, and a shared understanding of how the organization operates will help individuals understand what behaviors to emulate and what to expect from their co-workers, and this can decrease the amount of time it takes for individuals to build trust with each other (Levin et al., 2004; Zak, 2007; Mooradian et al., 2006; Abrams et al., 2003). Creating a common language for the organization creates environmental factors that promote consistency amongst groups and enable predictability to occur, which is essential for building trust (Mortensen & Gardner, 2021). Listening to employees when they share concerns and ensuring that there are no consequences for speaking up is an action that demonstrates employees' opinions are valued and trusted (Levin et al., 2004). Similarly, when mistakes or failures happen, organizations that celebrate the learning that comes from these events will ensure employees feel safe to continue sharing potentially bad news (Edmundson, 2011; Brower et al., 2017), and this is another way to signal a high-trust culture. Holding employees accountable for engaging in a trustworthy manner will reinforce that trust is a crucial element of the culture (Abrams et al., 2003; Zak, 2007). When rewards systems are seen as fair, this builds trust between

employees and the organization (Bartol & Srivastava, 2002). Individuals will build trust with organizations in the same way that they build it with other individuals, and so they will need time to ensure the organization's words and actions are aligned, that promises are kept, and that their behaviors can be predicted (Wzorek, 2021). By enabling cooperation and positive group behavior, knowledge-sharing is also improved (McNeish & Mann, 2010; Ling, 2011). Through deliberate actions and reinforcing the right behaviors, any organization can develop a high-trust culture.

It is important for new groups to spend more time together at the beginning of their formation to establish trust. Typically, positive first impressions will be confirmed as time goes on, which will strengthen trust, but if problems arise, trust could be depleted or never built in the first place (McKnight et al., 1995). When new teams are being formed, it will be necessary for the organization to invest in team-building exercises to develop trust and allow time for these high-trust relationships to form (Evans et al., 2019). These moments where individuals can interact with each other will provide more opportunities for individuals to assess each other's potential competence and benevolence (Levin et al., 2004; Evan et al., 2019). Ultimately, team members need to be comfortable being vulnerable with each other to build a high-trust team (Lencioni, 2002). They need to feel comfortable sharing their failures to provide valuable learning for the team (Lencioni, 2002; Edmondson et al., 2001). Strong relationships will cultivate trust, but as long as weaker relationships still provide the opportunity to create competency-based trust, individuals will be able to share valuable knowledge (Evans et al., 2019). Interpersonal trust and an organization's commitment to a high-trust culture will enable individuals to effectively share and use knowledge (Singh & Srivastava, 2009; Conley & Zheng, 2009).

When organizations design their policies to minimize risk, this can accidentally signal a lack of trust in employees (Brower et al., 2017). In general, an organization's systems will indicate a high or low trust culture, and organizations with fewer controls will indicate a more positive intention to trust (McNeish & Mann, 2010; Schoorman et al., 2007). Additionally, if the organization has a controlling system, trust may be attributed to the system rather than the individual, preventing genuine trust from forming (Schoorman et al., 2007). Organizations that provide individuals with autonomy and agency will signal trust to employees; this can be done by allowing employees to choose the projects they will work on, as well as allowing the employee the decision-making authority to determine how the project will be completed (Zak, 2007; Esser, 2021; Brower et al., 2017). If management is trusted by senior leadership, then typically, managers will extend this trust to their team members, and trusting each other will become the expected behavior within the organization (De Cremer, 2020). When leaders focus on creating an environment that supports employees to make their own decisions, they are more adaptable, leading to longer-term success for the organization (Esser, 2021).

As mentioned previously, knowledge-sharing and trust form a symbiotic relationship, and so when organizations share knowledge broadly and communicate their goals, as well as their achievements and failures, this will all foster trust and ensure communication happens throughout the organization (Zak, 2007; Hurley, 2006). Senior leadership support will be required to ensure knowledge management practices are prioritized and thriving throughout the organization (Conley & Zheng, 2009; O'Dell & Hubert, 2011). Ultimately, the organization must prioritize knowledge-sharing and clearly communicate its benevolent intentions with these activities to ensure its adoption throughout the organization (Conley & Zheng, 2009). When organizations are undergoing a transformation or a response to a crisis, many organizations will prioritize communication, but it will be just as essential to communicate what is not changing to provide indicators to employees about what they can continue to rely on since predictability is a crucial element in trust-building (Mortensen & Gardner, 2021). A lack of communication

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from management may create suspicion amongst employees and lead to higher distrust (Hurley, 2006). Transparent, honest, open, and timely communication will signal that employees are trusted, which is incredibly important in both good times and challenging times (Brower et al., 2017).

While an organization can develop trust intentionally and set the right examples, ultimately, having team members who will naturally orient to knowledge-sharing will be important. Individuals will bring their own preconceived notions of how to build trust in the organization. It is vital to hire individuals who enjoy learning and new challenges to build teams that work well cross-functionally and in other cultures (Casciaro et al., 2019). Creating teams with diversity in background, skillset, or simply from another part of the organization will enable teams to work better across silos, facilitating trust-building and knowledge-sharing (Casciaro et al., 2019). When teams believe that their success is intertwined with their teammates' success, this will create more positive behaviors and collaborations (Edmondson, 2015). Teams that prioritize learning and have leaders who invest in creating safe spaces for learning, experimentation, and failing also create more successful teams (Edmondson et al., 2001). When teams can form and work together effectively over time, this will enable a high trust team to form; however, after some time, the team members will have access to a lot of the same knowledge as each other. Moving team members to new teams or projects across the organization can enable better knowledge sharing (Evans et al., 2019). Managers must both reward and recognize the positive behaviors, as well as reprimand the negative behaviors to ensure their teams develop appropriately and they achieve the type of team they want.

## **Remote Cultures**

While many organizations only adapted to remote work because of the Covid-19 pandemic, many organizations are considering continuing this model after the pandemic, or adapting to a “hybrid model” where employees can choose to work both in-office and at home, always at home, or always at the office (Alexander et al., 2020). Organizations see many benefits such as increased job satisfaction from employees, increased productivity, cost reductions, and access to more talent (Alexander et al., 2020; Abrams, 2019). Employees see being able to work from home as a perk since it enables them to have better work-life balance. To ensure the organization maintains its culture and employee satisfaction within this new configuration, organizations will need to be mindful of their remote culture. Hybrid models will need to be mindfully created so that the in-office culture does not outweigh the remote culture, leading to the remote employees being at a disadvantage (Alexander et al., 2020). For remote cultures to be successful, managers and employees will need to shift their mindsets; it is not only technology that enables remote work, but it is the individuals' abilities to build a high-trust culture and effectively collaborate virtually (Heskett, 2020).

Some organizations have transitioned to completely remote models such as GitLab ([about.gitlab.com](https://about.gitlab.com)). The company moved to an all-remote model and now has 1000 remote employees worldwide (Choudhury & Salomon, 2020). GitLab's CEO, Sid Sijbrandij believes that a remote company scales better than a traditional format since many of the processes that enable companies to scale also enable them to work remotely better such as deliberate corporate communication, documented processes, and effectively working across time zones (Choudhury & Salomon, 2020). The culture at GitLab reinforces the importance of communication of all types, including providing constructive feedback and documenting all processes. They found that documentation was a core tenet of their remote model to ensure everyone had access to the same information and could work effectively. They ensure decisions are documented,

and meetings are recorded and available to be watched later. This commitment to knowledge-sharing while working remotely demonstrates how while knowledge-sharing may be challenged in a remote environment, it is crucial to success.

## **Leadership**

Leaders at all levels of the organization play an essential role in building trust and encouraging knowledge-sharing (Lee et al., 2010; Zak, 2019). Employees will naturally model their leaders' behavior, so if the leader is sharing their knowledge and acting trustworthy, others will do the same (Zak, 2019). Leaders who engage in transformational leadership tend to build a high degree of trust in their leadership with their team members (Lee et al., 2010). Transformational leaders encourage their team members to go beyond what they thought possible and achieve positive outcomes. They are typically successful at encouraging their teams to share knowledge and collaborate (Lin & Hsiao, 2014). When leaders act as knowledge builders, they encourage knowledge sharing and provide a positive model for team members to emulate. Knowledge builders help the team build new knowledge; they bring in new ideas to the team, evaluate the team's work quality, and improve it (Lee et al., 2010). Engaging with the team and helping them build their knowledge reinforces knowledge-sharing, but leaders also demonstrate their competence, which is essential in building trust (Lee et al., 2010; Zenger & Folkman, 2019). Promoting curiosity and continuous learning can help build a more supportive environment for individuals to learn from each other (Delizonna, 2017), which will help build trust and knowledge-sharing behaviors.

Leaders are no different from individuals and need to demonstrate competence, benevolence, and integrity to be trusted by their team members (Lee et al., 2010). When individuals feel their leaders are authentic and genuinely care about them, this helps build trust (Frei & Morriss, 2020). Team members will trust leaders who build good relationships with others, are knowledgeable about the work, and are consistent in their words and actions (Zenger & Folkman, 2019). However, if trust is only between the individual and the leader, the team does not benefit from this trust; team-building exercises and other trust builders must happen within the team, not just with the leader and the individuals on the team (Lee et al., 2010; Lencioni, 2002). Individuals may also question how a leader received their position; individuals need to feel there is legitimacy to an individual's authority to trust it (Sucher & Gupta, 2019). In general, if a leader is trusted, they are typically found to be a more effective leader than one who is not trusted (Zenger & Folkman, 2019). Trustworthy leaders will more likely receive sensitive information from their employees, which could be critical to avoiding more significant issues or mistakes (Lee et al., 2010).

Managers will need to adapt their management style for a remote environment and ensure they treat remote and in-office employees fairly. When mixing remote workers with in-office workers, teams should be held to the same standards of performance, and these standards should be observable by all so that no team is disadvantaged by their location (Alexander et al., 2020). Defining clear goals for teams, and then providing them the freedom to determine how they are accomplished, and holding them accountable for doing so is an effective strategy (Alexander et al., 2020). Being visible in the office does not necessarily mean a worker is more productive than a remote worker, and so therefore, if performance management is about workers achieving their assigned goals, this creates a fairer evaluation experience for all employees (Sull et al., 2020). Leaders will need to ensure they maintain psychological safety with their team so that trust continues to be built and individuals feel safe sharing their knowledge (Edmondson & Daley, 2020; Delizonna, 2017). Team members need appropriate support to work remotely effectively and deal with some of the drawbacks, such as lack of social contact or feelings of isolation (Parker et al., 2020). As

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previously mentioned, building trust in a remote environment is different from building it in person since individuals have less access to view the typical social cues that would help build trust (Edmondson & Daley, 2020). Effective, consistent, and constant communication from leadership is critical for building bridges with remote employees to feel included and knowledgeable about what is going on within the organization (Parker et al., 2020). Leaders can help their teams build trust in a remote environment by introducing new team members, highlighting their expertise, and creating communication norms that promote frequent communication to reduce ambiguity (Neeley, 2018; Alexander et al., 2020). Encouraging virtual meetings to begin or end with casual conversation and personal sharing (like sharing pet pictures) is helpful for individuals to build more personal knowledge of each other, which will help build trust (Neeley, 2018; Alexander et al., 2020). Even in remote environments, it is essential to invest in time for team members to get to know each other at a deep level to feel comfortable being vulnerable with each other (Lencioni, 2002; Abrams, 2019; Alexander et al., 2020). Teams with a strong identity create a strong bond, which creates a feeling of closeness that goes beyond traditional geographic proximity (Abrams, 2019). By investing in the appropriate leadership strategies for a remote culture, managers can see the benefits of remote work, such as increased employee satisfaction, productivity, and loyalty. While these strategies are foundational to good management, remote workers can be overlooked due to a lack of visibility, and so this is where procedures, performance management, and other activities need to be effectively adapted for remote work.

## **Digital Trust and Tooling**

While organizations have been implementing information communication technology regularly for years, the Covid-19 pandemic forced many organizations to accelerate their digital roadmaps (Hill, 2020). While trust is always essential for any organizational transformation, it is imperative to create resilient organizations that can implement new technology and see the intended benefits quickly (Hill, 2020; Albinson et al., 2019). Individuals need to trust digital knowledge repositories to feel secure sharing their knowledge in these spaces. If the system has too many controls and requires individuals to go through too many hurdles to share their knowledge, users may abstain from using the system (Chakravorti et al., 2018). To effectively implement these new technologies, organizations need to effectively weave trust and oversight within the technology to ensure adoption (Hill, 2020; Albinson et al., 2019). In looking at different consumer-based systems like eBay, Airbnb, or Uber, each of these systems has built a way for users to trust the system so that they can quickly trust other users and engage in transactions that would typically require a lot of trust (Tanz, 2014; Honda & Kotaka, 2020). When individuals feel the system will protect their interests, they continue to engage with the system (Tanz, 2014; Honda & Kotaka, 2020; McNeish & Mann, 2010). The other benefit these consumer-based systems have is that they are linked with their customers' social media, and so the system, as well as other users, can learn about whom they are interacting with ahead of the transaction, and this helps build trust (Tanz, 2014; Honda & Kotaka, 2020). Since each interaction provides the opportunity for feedback from both participants, inappropriate behavior will be found out, and bad actors can be banned from the system (Tanz, 2014). This level of accountability, transparency and feedback from participants can form powerful lessons for how individuals will feel comfortable interacting with other digital systems such as knowledge repositories. When technology can increase transparency while respecting data privacy and security, this can increase digital trust that will extend to the organization (Albinson et al., 2019).

There are several best practices to build trust, specifically within knowledge repositories, to ensure both the technology is adopted and that users feel comfortable sharing knowledge in this space. Many employees from organizations who have successfully transitioned to a remote model list the knowledge repository as crucial for maintaining connection and ensuring employees have the information they need to do their jobs (Sull et al., 2020; Choudhury & Salomon, 2020). Organizations need to reinforce creating quality content, and they need to hold contributors accountable for maintaining content quality (Trees & Harper, 2020; Lin et al., 2020). Content must include evidence that it is trustworthy, and this evidence must be maintained over time (Lin et al., 2020). Content trust indicators can be achieved by displaying metadata such as the contributor's name, the date the content was published, the date the content was last reviewed, and how it was verified (Trees & Harper, 2020). Content should be easy to use, easy to understand, and easy to find (Hargis et al., 2004). Easy-to-use content is accurate, complete, and helps employees complete the task at hand. Easy-to-understand content is jargon-free, includes examples, and is written clearly and appropriately. Content that is easy to find is organized, searchable, and the page layout makes it easy to scan and find the relevant information the user is looking for (Hargis et al., 2004). Content needs to be regularly managed, and outdated and duplicate content should be archived (Trees & Harper, 2020). Users are more likely to trust content from people they know, and so employee profiles that showcase employees' knowledge and expertise will help users build trust with each other, and therefore their knowledge assets (Trees & Harper, 2020). User profile data provides transparency, accountability, and the ability to provide the content author feedback, which is essential for building trust and is a great lesson from the sharing economy apps that have enabled many strangers to trust each other effectively (Tanz, 2014; Lin et al., 2020). Each organization will have a different culture, and therefore, a knowledge repository that aligns with that organization's culture and uses the same terminology as the organization, and focuses on the organization's specific needs will garner more trust than a system that is not customized (Lin et al., 2020). In addition to an up-to-date and highly usable knowledge repository, organizations should create a space for teams to ask questions and receive timely answers (Trees & Harper, 2020). Organizations that recognize those that contribute to the knowledge repository (Trees & Harper, 2020) and reinforce how the knowledge repository is helpful to the organization will motivate more employees to share their knowledge in this manner (Kankanhalli et al., 2005). Showcasing moments when the organization has been helped by the knowledge shared in the repository will also motivate more knowledge-sharing in the knowledge repository. This communication will further enforce that sharing knowledge is expected behavior and part of the organization's culture (Kankanhalli et al., 2005).

## **FUTURE RESEARCH DIRECTIONS**

As organizations embrace working in remote, hybrid, and distributed environments, future research should be directed at how individuals build trust in a remote environment and how organizations can build high-trust remote, hybrid, and distributed teams. Knowledge-sharing in remote teams specifically will add a helpful dimension to the field, and of course, how trust intersects with this dimension of knowledge-sharing would be valuable research. Exploring different digital knowledge repositories and how they enable trust to be built for knowledge-sharing in remote environments would benefit both academics and practitioners.



## CONCLUSION

Due to the increase in remote work, distributed teams, and digital transformations, many people work under new conditions than previous generations. Many interact with people they have never met in person before, and yet they are expected to perform with the same level of quality and consistency as their in-office counterparts. Trust is not a given; it must be built with intention for both individuals and organizations. Leaders need to enable their teams to build and operate with integrity, benevolence, and competence-based trust to effectively share knowledge. Without trust, individuals will not naturally share knowledge with each other, so trust is crucial for building a knowledge-sharing culture. To enable individuals to work remotely, employees need to trust the digital systems the organization has implemented, and the same knowledge-sharing trust behaviors that work in between individuals need to be implemented with digital content. Organizations with both a culture of high trust and effective knowledge-sharing practices will see more incredible innovation, performance, and endurance in the face of the rapidly changing landscape in which they operate.

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## KEY TERMS AND DEFINITIONS

**Benevolence-Based Trust:** The belief that the other party will act with positive intentions within an exchange.

**Collaboration:** When individuals or teams work together to create something. Collaboration is often required on projects.

**Competence-Based Trust:** The belief that the other party is reliable, knowledgeable, and has the required expertise for the task at hand.

**Digital Trust:** Reliance on technology systems to share knowledge or perform other tasks.

**Integrity-Based Trust:** The belief that the other party is acting in accordance with moral values (or values similar to the individual).

**Knowledge Repository:** A digital technology system where content can be stored and retrieved for use.

**Knowledge Sharing:** The exchange of relevant explicit or experiential knowledge between two or more parties.

**Remote Work:** Working from home or from the location of a person's choice, rather than working from an office owned by the organization.

**Trust:** A decision to make oneself vulnerable to another during an exchange.

# Chapter 3

## Knowledge Leaders as Multipliers: Creating and Promoting the Conditions for Successful Knowledge Management

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### **ABSTRACT**

*In order for knowledge management (KM) to thrive, an organization requires a combination of conditions that form the runway from which a KM initiative can take off. There is general agreement that technology, human resources, organizational culture, and leadership are among the key enablers of successful KM. The intentions and actions of knowledge leaders in particular can make a profound difference to how KM is institutionalized in an organization. The relationship between leadership and KM has been studied extensively, especially established leadership styles such as transformational and transactional leadership. In this chapter, the authors explore the influence of knowledge leadership on KM through the lens of Liz Wiseman's leadership paradigm, Multipliers. The authors propose that effective knowledge leadership reflects the traits of the multiplier: leaders who draw on certain skills and approaches to effectively "multiply" the intelligence of an organization.*

### **INTRODUCTION**

Implementation of knowledge management (KM) is a multistep process (Rhem, 2015), with the potential for interruption at any step along the way. Not only does the practice involve the capture, sharing, and reuse of material that can often be ambiguous and dynamic, but it takes place in a complex environment that is susceptible to changing circumstances. Externally, for example, organizations are faced with intense competition, regulatory changes, and the pressures of globalization. In the face of these and other

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such challenges, it can be difficult to prioritize KM initiatives, particularly given the substantial and consistent investments required for KM and the difficulty of quantifying its impact.

Internally, KM is dependent on several interdependent enablers, including organizational culture and the actors within that culture—both of which are difficult to change. In an organizational setting where employees hoard their knowledge because it is seen as a source of competitive advantage among their peers, or where failures and lessons learned are not shared for fear of negative consequences, KM implementations will be arduous as they require practices that will appear to work against the prevailing culture.

Under these circumstances, leaders play a critical role in shaping the success of KM in an organization. The quality bar of KM is determined by the skills and behaviors leaders employ, and KM can live or die by them (Donate & Sánchez de Pablo, 2015). However, because different people lead in different ways, the influence of varying leadership styles on the discipline is an area that has been explored at length. In particular, emphasis has been placed on the role of transformational and transactional leadership styles in KM.

This chapter offers a contemporary perspective on the delicate alchemy between leadership and KM by exploring the topic through the lens of “Multipliers” (Wiseman, 2017). The chapter begins by outlining the conditions which are commonly understood as being enablers of successful KM: Technology, human resources (HR), organizational culture, and leadership. Subsequently, the authors explore knowledge leadership in more detail, discussing the competencies which are associated with effective knowledge leaders using the language of Multipliers. This language offers an interesting and exciting way to discuss leadership, with a particular emphasis on those styles and qualities that can be seen to amplify the strengths of those being led, producing a ripple effect that can resonate throughout an organization.

## **BACKGROUND**

The crafts of leadership and KM, as well as the intersection of the two, have been well-documented and studied—especially since the advent of information technology (IT) (Cleveland, 1985). Early interest in the relationship between leadership and KM emerged from an understanding that leadership was a critical component of successful KM implementations. A study by Andersen and the American Productivity and Quality Center (APQC) (1996) identified the lack of commitment from senior leadership as a critical reason why organizations are unable to effectively implement KM practices. In their survey of successful KM projects, Davenport et al. (1998) identified senior management support as one of eight factors contributing to the successful implementation of a KM initiative.

Many of these foundational studies focused on the importance of leadership broadly defined, namely they considered the impact of supportive executives of all kinds, not just those who are responsible for the management of organizational knowledge or information. Such people are often known as *knowledge leaders*, people who provide “strategic visions, motivate, communicate, and give direction to drive the company in a changing context” (Bertoldi et al., 2018, p. 589). Kluge et al. (2001) indicated, for example, that formal leaders at all levels of an organization have unique roles to play in KM, with Chief Executive Officers (CEO) being of particular importance to the knowledge sharing process. Roth (2003) compiled different types of knowledge-oriented workers (e.g., knowledge activist and knowledge broker) who fulfill various aspects of knowledge leadership without necessarily being in formal leadership positions.

As adoption of KM gained traction in corporate settings, some researchers began exploring the role of dedicated knowledge leaders in the success of KM (Abell & Oxbrow, 1999; Bontis, 2001; Cope-



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land, 1998; Earl & Scott, 1999; Herschel, 2000; Leitch & Rosen, 2001). This was the era of the Chief Knowledge Officer (CKO). Liebowitz (1999) considered the need for a CKO (or equivalent) and KM infrastructure as the second ingredient to the success of an organization's KM strategy. He viewed this knowledge executive as an "advocate for knowledge and learning" (p. 38) and described them as "the designer and overseer of an organization's knowledge infrastructure, [taking] the leading role in the design and implementation of an organization's knowledge architectures" (p. 38). More recently, De-Tienne et al. (2004) explored existing research on organizational culture, leadership, and the role of the CKO, suggesting that, while more companies were creating differentiated knowledge leadership roles, the actual responsibilities, qualifications, and impact of those roles were still unclear.

As interest in defining KM success and its enablers intensified, researchers began applying frameworks from other disciplines (e.g., business and education) to KM. One avenue that has been explored (Bryant, 2003; Crawford, 2005; Johnson, 2002; Politis, 2002) is the effect of different leadership styles on KM, particularly the role that transformational and transactional leadership play in managing knowledge, encouraging learning, and creating a knowledge-oriented culture.

Transformational and transactional leadership gained notoriety thanks to James MacGregor Burns's (1978) seminal study of leadership. Scouller and Chapman (2020) described a transformational leader as someone who "taps into his followers' higher needs and values, inspires them with new possibilities that have strong appeal and raises their level of confidence, conviction and desire to achieve a common, moral purpose." A transactional leader, however, "causes a follower to act in a certain way in return for something the follower wants to have (or avoid). For example, by offering higher pay in return for increased productivity" (para. 3).

Typically, both styles are treated as being mutually exclusive, with the transformational style often framed as superior to the transactional style of leadership. This is observed by Antonakis (2012) in Burns' original study, and is also demonstrated by Kuhnert and Lewis (1987, table 1, p. 652), who suggested that transactional and transformational leadership indicate lower and higher leadership maturity respectively. However, this is somewhat contradicted later on, as Kuhnert and Lewis implied that leaders at the highest stage of maturity can opt in and out of the transactional style as needed (p. 653).

In his landmark study, Politis (2002) tested Bass's (1985) model of transactional and transformational leadership against a variety of KM skills or traits. The author found there was a significant positive relationship between attributed charisma—a dimension of transformational leadership—and knowledge sharing, as charismatic leaders instill pride, faith, respect, and a sense of mission into others. Micić (2015) affirmed that charismatic leadership is a necessary requirement to implement each of the seven phases of the knowledge management cycle (KMC) model (Evans et al., 2014). However, other leadership traits are paired with each KMC phase as well, with no indication of which trait is more dominant, or how the traits may interact with each other. This makes it difficult to know how to best apply oneself as a leader in each KMC phase.

While eschewing the transactional—or any other leadership style—in favor of the transformational is a persuasive notion, research has suggested that transformational leadership alone does not guarantee the success of KM initiatives. Critics point to the conceptual ambiguity of transformational leadership, and argue it is a style which can give way to antidemocratic consequences when overexpressed (Lee, 2014). As a result, some researchers (Donate & Sánchez de Pablo, 2015; Ribière & Sitar, 2003) have examined how a mix of transactional and transformational leadership styles are best suited to knowledge-oriented leadership—that is, "leadership that simultaneously supports both explorative (i.e., creation) and exploitative (i.e., storage, transfer, and application) initiatives" (Donate & Sánchez de Pablo, 2015, p. 361).

These researchers suggest that KM requires effort from both transformational and transactional leadership approaches, not one in defeat of the other (Bass, 1985; Nguyen & Mohamed, 2011; Politis, 2001).

Other research has explored the relationship between knowledge leadership and organizational culture, another enabler of successful KM. Organizational culture has its roots in the work of theorists such as Edgar H. Schein, who defined it as “the accumulated shared learning of that group as it solves its problems of external adaptation and internal integration” (Schein & Schein, 2016, p. 6). Barney (1986) established that, when an organization’s culture is rare, valuable, and inimitable, it can be a source of sustained competitive advantage. In the KM context, research has primarily focused on how organizational culture influences KM and the characteristics of a knowledge-friendly culture.

De Long and Fahey (2000) identified four ways in which organizational culture influences KM behaviors: 1) Culture informs how people understand what knowledge is and what is worth managing; 2) culture defines rules and roles around access to and dissemination of knowledge; 3) culture creates the social context that dictates how knowledge will be used; 4) culture shapes how new knowledge is created, legitimated, and shared. Gold et al. (2001) identified culture, as well as technology and structure, as the components of a knowledge infrastructure that, together with a knowledge process architecture, are essential preconditions for effective KM.

Further research has sought to understand what aspects of an organization’s culture positively influence the success of KM initiatives. In Holsapple and Joshi’s (2000) study of factors that influence KM in organizations, they noted the prevalence of factors such as leadership, technology, measurement, organizational structure, and motivation in the existing research. Choi and Lee (2003) identified trust, collaboration, and learning as key organizational values underlying knowledge creation and sharing. Researchers have also studied the explicit relationship between leadership and organizational culture in KM initiatives. Of particular interest are studies (Donate & Guadamillas, 2010; Le & Lei, 2018; Nguyen & Mohamed, 2011; Noruzy et al., 2013) that have sought to understand whether leadership, organizational culture, and/or specific knowledge-supportive values (e.g., trust and innovation) have a moderating effect on the success of KM.

This context is an invitation to explore familiar topics in a new light, leveraging the language on effective leadership supplied in Liz Wiseman’s book *Multipliers: How the Best Leaders Make Everyone Smarter* (2017). The culmination of a study of over 550 leaders in varied industries and educational settings (Wiseman et al., 2014), the book introduces the concept of a Multiplier—an individual who creates the conditions for others to perform at their best and multiply the intelligence of those around them (FranklinCovey, 2018). The foil of the Multiplier is the “Diminisher,” who leads in a way that stifles collective intelligence. The impact of this can effectively shut others down, discouraging or limiting their contribution. Wiseman asserts that the Multiplier paradigm is “necessary for accessing the intelligence and potential of people in organizations everywhere. It unearths and explains why some leaders create genius all around them, while other leaders drain intelligence and capability from an organization” (p. xiii). According to Wiseman, this leadership model makes a previously unresearched connection by examining the impact of leadership based on how successfully it unlocks and leverages intelligence:

*I’m coaching other executives in tech...really smart, but not necessarily aware of the impact they’re having on others...I thought you know...let me find a good article so I can help this one executive understand that his intelligence isn’t contagious. I went looking for something around like the multiplication of intelligence and there was nothing out there. It was such an important observation that, like, surely someone has researched this and they hadn’t. (FranklinCovey, 2018, 2:19)*

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Assuming intelligence indicates knowledge by extension, Wiseman's assertion is intriguing and may suggest crucial connective tissue between leadership and knowledge management outcomes. As a result, the authors feel this model provides useful language through which knowledge leadership can be further understood. This chapter will explore knowledge leadership in part through the lens of Multipliers and Diminishers, which the authors believe to be an accessible way of discussing such a critical topic in the field of KM.

## **KNOWLEDGE MANAGEMENT ENABLERS**

Because KM operates within an organizational context, with its own norms and rhythms, actors, and rituals, it is important to begin a discussion on successful KM leadership by examining the elements that make KM successful in the first place. These *enablers* are the mechanism by which organizations can develop knowledge and stimulate its creation, communication, and protection (Yeh et al., 2006). Seen through another lens, they can be understood as critical success factors (CSF) for effective KM, particularly when they exist together and work in harmony. In this way, enablers are “the limited number of areas in which satisfactory results will ensure successful performance for the individual, department or the firm” (Sedighi & Zand, 2012, p. 1).

Although there is currently no unified model that defines CSF for KM, the most commonly identified enablers fit into four categories: IT, HR, organizational culture, and leadership.

### **Information Technology**

IT refers to the information systems and technical networks that form the building blocks for capture, storage, and sharing of both tacit and explicit knowledge (Gold et al., 2001). This enabler is foundational; in today's distributed and information-intensive environment, KM is dependent on the existence of a well-developed technology infrastructure (Lueg, 2001).

Among other advantages, IT supports communication, collaboration, information retrieval, knowledge reuse, and learning. In the hands of a strong leader, it can support the integration of information and knowledge from disparate parts of an organization, and ensure that integrated knowledge flows efficiently throughout the organization. The United States (US) Department of Navy, for example, leveraged off-the-shelf commercial technology and a common taxonomy to enable rapid, context-oriented collaboration at sea as part of the Stennis Battle Group project (Bennet & Porter, 2003).

An effective knowledge leader knows that IT—in the form of repositories, knowledge bases, document management systems, customer relationship management systems, search tools, and other such applications—can also remove barriers (e.g., time, distance, and hierarchy) that would otherwise be detrimental to successful KM.

### **Human Resources**

While IT is decidedly a critical enabler of KM success, it is worth emphasizing that IT itself is not KM. This is borne out by the failure of many early KM initiatives that relied heavily on the implementation of KM-supportive applications with little emphasis on the state of other KM enablers (Rivière & Calabrese, 2016). While investments in IT are an unavoidable component of any KM initiative, a strong knowledge

leader understands that these should not come at the expense of other CSF, particularly people/HR. As Bhatt (1998) pointed out, knowledge is people-centered, the product of an evolving and flexible social system that sits atop the technological system discussed above. Effective leaders recognize that people are knowledge creators and communicators, and their values influence the way they interact with KM technology. As a result, as knowledge hoarders or change resisters, they have the potential to be a substantial barrier to KM success.

Thus, knowledge leaders understand that, for KM to succeed, people at all levels of the organization must be informed, motivated, and empowered. Training helps employees understand the *why* behind KM activities, equips them with a common language for thinking about knowledge, and teaches them supportive behaviors so they can contribute effectively to organizational KM. Hewlett-Packard (HP) Consulting and the World Bank, for example, have both incorporated KM training into the onboarding of new employees (O'Dell et al., 2003).

Incentives that encourage people to communicate and share knowledge are also important, and these incentives should be tied to overall employee evaluation and compensation. At Buckman Labs, “incentive, evaluation, and promotion systems are designed to reward employees who share and transfer knowledge” (Holsapple & Joshi, 2000, p. 60). The US Secretary of the Navy created awards to recognize teams that achieve efficiency through knowledge sharing (Bennet & Porter, 2003).

Strong knowledge leaders strive to organize people into structures that encourage teamwork, collaboration, networking, and peer learning. These structures may be formal and reflected in the structure of the organization itself, but, due to the hierarchical nature of most organizations, they are often informal—a product of the organization’s culture.

## **Organizational Culture**

Organizational culture is the third and arguably most important of the KM enablers. It refers to shared assumptions, values, and norms (Schein & Schein, 2016). In the KM context, a knowledge-friendly culture is one “where knowledge and information are valued and where knowledge creation, sharing, and utilization are a natural and instinctive part of business” (McManus & Loughridge, 2002, p. 320). Research has repeatedly demonstrated that the optimal culture for KM is one that consists of “norms and practices that promote the free-flow of information among employees and across department lines” (DeTienne et al., 2004).

Thus, cultures that encourage knowledge sharing and learning, and create the conditions to enable interaction and collaboration between employees at multiple levels of an organization may be considered knowledge-friendly organizations. Organizational learning can occur in many ways that are supported by KM. Knowledge leaders at the St. Paul Company, for example, wove corporate learning into leadership development: “Executives teach, employees learn, and, in the process, best practices are developed, refined, and communicated” (KMM, 2001, p. 5).

Alternatively, such conditions can take the form of communities of practice or knowledge networks, which are “institutionalized, informal groups of professionals that manage a specific knowledge domain and share expertise and passion for that knowledge domain” (Alavi et al., 2005, p. 203). HP Consulting, Xerox, Microsoft, Siemens, the World Bank, and more have all created communities to connect experts, encourage sharing, enhance social capital, and support knowledge reuse (O'Dell et al., 2003; Garfield, 2017). The National Aeronautics and Space Administration’s (NASA) Ed Hoffman is credited with leveraging the organization’s existing culture of storytelling among engineers and project managers

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by forming them into communities of practitioners and formalizing their knowledge sharing practices (Garfield, 2017). Ultimately, strong knowledge leaders such as this understand the value of connecting experts in order to facilitate the flow of knowledge throughout the organization.

Another way in which a knowledge-friendly culture is demonstrated is via the values espoused by the organization, reflected in its overall vision and strategy and communicated by its leaders. Organizations with values such as openness, support, trust, learning, and cooperation have been shown to encourage individuals to participate in constructive knowledge behaviors such as the sharing of insights. Trust in particular is seen as a critical component of a knowledge culture, as the degree of trust that exists between all levels of an organization influences the flow of knowledge in that organization (De Long & Fahey, 2000; Gold et al., 2001).

For knowledge exchange to be possible, trust must exist both among individuals (knowledge-based) and with the organization as a whole (institution-based). Without knowledge-based trust, employees will resist sharing their expertise with others out of fear of losing an advantage or being taken advantage of, and they will be wary of knowledge received from others. Without institution-based trust, employees will resist sharing and learning out of fear that mistakes will lead to negative consequences. Davenport and Prusak (1998) highlighted British Petroleum's Virtual Teamworking project as an example of this, as the success of the project "was attributed largely to the trust that was established and subsequently existed among the project team members, management, and other project participants" (as cited in De-Tienne et al., 2004, p. 32).

## **Leadership**

The overarching theme of studies on the organizational culture enabler is that

*"good" cultural values such as sharing, openness, and trust will lead to positive KM behaviors (e.g., knowledge contribution and sharing), which will lead to innovation and efficiencies, whereas "bad" values will lead to dysfunctional KM behaviors (e.g., information hoarding) and, hence, undesirable outcomes such as inefficiencies. (Alavi et al., 2005, p. 197).*

Ultimately, it is the responsibility of leadership—the fourth KM enabler—to create the conditions for a supportive, knowledge-friendly culture.

Leadership in this context refers not only to knowledge leaders, but to senior management and executives who are not explicitly tasked with knowledge-oriented responsibilities. These individuals set the example for everyone in the organization, so they play a key role in endorsing the values, providing the resources, communicating the vision, and setting the expectations that make KM possible (Yeh et al., 2006). Finally, knowledge-oriented leaders understand that knowledge is an asset—perhaps the company's most important resource—and a source of competitive advantage.

## **MULTIPLIERS: A LEADERSHIP PARADIGM**

The cultural outputs of Multipliers parallel those cultural values which lead to positive KM behaviors. It is said that Multipliers "build collective, viral intelligence in organizations" (Wiseman, 2017, p. 32). When individuals and teams are in a Multiplier-led environment, they feel safe to express themselves.

They share their thoughts, challenge opinions, offer solutions—in effect, there is an undercurrent of trust which enables knowledge to be shared, believed, and used freely.

The antithesis of the Multiplier is the Diminisher, leaders who are “absorbed in their own intelligence, stifle others, and deplete the organization of crucial intelligence and capability” (Wiseman, 2017, p. 32). The culture these leaders foster is one that results in dysfunctional KM because sharing, openness, and trust are compromised. People can feel as if their opinion is not valuable, doubt their intelligence, or defer to receive and carry out instruction without question. In this instance, knowledge sharing is one-way and comes from the Diminisher, rather than flowing freely among a Multiplier-led collective. The Diminisher may also treat knowledge as classified, acting as a gatekeeper to the knowledge and taking sole authority and responsibility for its dissemination.

Wiseman (2017) identified five disciplines or areas in which Multipliers differentiate themselves from their diminishing counterparts (Table 1).

*Table 1. This table illustrates the five disciplines or areas for multipliers, along with their diminisher counterparts.*

<b>Multiplier</b>	<b>Diminisher</b>
The Talent Magnet	The Empire Builder
The Liberator	The Tyrant
The Challenger	The Know-It-All
The Debate Maker	The Decision Maker
The Investor	The Micromanager

When a counterpart is in action, the other is muted, but this does not mean that the two are mutually exclusive. In reality, good leaders can also manifest diminishing behavior, known as *The Accidental Diminisher*. Wiseman (2017) describes them as “managers with the best of intentions having a diminishing impact on the people we lead [...] by our honest attempts to help, teach, or lead by example” (p. 191). Because the acts of helping, teaching, and leading by example are knowledge-sharing actions, a diminishing result suggests that the manner in which they are carried out is important to how they are received.

At a high level, the five skills or disciplines of Multipliers are: Attracting and enabling talent (known as “The Talent Magnet”); creating optimal conditions for learning (“The Liberator”); extending challenges that allow others to rise to the occasion (“The Challenger”); encouraging debate and thoughtful conversation (“The Debate Maker”); instilling ownership and encouraging accountability (“The Investor”).

## **The Talent Magnet**

Leaders seen as *Talent Magnets* curate the conditions for talent to stretch, grow, and move on. It is seen as a win, not a loss, when talent has outgrown their current role and moves to the next level in their career. The *Talent Magnet* eschews selfishness in exchange for putting the development needs and career goals of the employee first. By contrast, the diminishing counterpart, known as *The Empire Builder*,

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is a talent hoarder, under-utilizing and under-challenging employees in an effort to keep them in place. Under these conditions, talent can wilt, stagnate, and quit out of frustration (Wiseman, 2017, p. 62).

### **The Liberator**

*Liberators* represent another discipline of the multiplying leader. They unlock innovation by doing two things: 1) They give others the space and freedom to think, envision, experiment, fail, and share what they learn from their mistakes; 2) the constraints they add to this environment serve to drive motivation and engagement. Interestingly, the leap from *Liberator* to its diminishing counterpart *The Tyrant* seems not as effortful as that required to move from *Talent Magnet* to *Empire Builder*. Just a small increase on the pressure dial can be enough to change energizing constraints to disempowering stress. A carelessly executed decision override from a leader can compromise the trust the employee has in the freedom he/she has been given. This can harm the confidence the employee has in his/her own abilities to make decisions and learn from them. The more a leader lacks faith in their employees' judgement, the more likely the leader is to dictate, overrule others, and listen only to himself/herself or a select few (Wiseman, 2017, p. 95).

### **The Challenger**

The third Multiplier is *The Challenger*. This leader sets assignments which stretch and challenge his/her employees. *Challengers* do not purport to know the answers, but believe in their employee's ability to figure it out. It gives them pleasure to find their employee has met, or even excelled, in the task, and, if the employee now knows more on the subject than their leader, all the better. The Diminisher in this pair is *The Know-It-All*. This leader derives validation from having all the answers, leaving no room for their employees to develop knowledge beyond what is known by the leader (Wiseman, 2017, p. 127).

### **The Debate Maker**

The end product for the fourth Multiplier, *The Debate Maker* (Wiseman, 2017), is a high-quality, high-stakes decision. To make it, these leaders hear from minds and perspectives from across the organization. They "lead rigorous debate that prosecutes the issues with hard facts and depersonalizes decisions. Through debate, they challenge and stretch what people know, thus making the organization smarter over time...creating the organizational will to execute the decisions made" (Wiseman, 2017, p. 133). In contrast, their diminishing counterpart, *The Decision Maker*, makes a high-stakes decision in isolation or in consultation with a select few (Wiseman, 2017). Without the wisdom of the collective, the decision can miss the mark, leading to lack of buy-in and resentment.

### **The Investor**

Finally, the fifth Multiplier skill is *The Investor*. *Investors* are leaders who "give other people the ownership for results and invest in their success" (Wiseman, 2017, p. 190). They coach and instill accountability in others. They set the tone for employees to take initiative, figure out how to solve a problem themselves and take full ownership of the outputs, whether positive or negative. They offer input when asked, but they do not use their position to "take over" and are diligent in ensuring the problem does not transfer to

them. The space *Investors* create for their employees is nonexistent when their diminishing counterpart, *The Micromanager*, is dominant. This leader is constantly in the weeds and finds it hard to relinquish control of the details (Wiseman, 2017). The reaction to *Micromanagers* is negative—employees can feel devalued, disinterested, and operating in a state of learned helplessness—why think or do anything when the leader’s going to do it anyway?

## THE MULTIPLYING SKILLS OF AN EFFECTIVE KNOWLEDGE MANAGEMENT LEADER

In a KM context, the skills of Multipliers are themselves multiplied. In the hands of an effective knowledge leader, they influence the organization as much as the individual. They extend to leadership as well as toward the broader KM community, and are as much about KM as a discipline as they are about the people practicing that discipline. While not all Multipliers are knowledge leaders, it may be fair to say that all knowledge leaders exhibit at least some of the skills of Multipliers.

Impactful KM leaders, for example, are builders. They demonstrate an entrepreneurial spirit, a high tolerance for risk, and tremendous energy (Earl & Scott, 1999; Garfield, 2017). These qualities are all important because they enable the knowledge leader to make their bold KM vision a reality. These leaders have a clear idea of what KM can do for an organization, and they work tirelessly to share their vision with others in order to garner executive sponsorship and secure buy-in from competing initiatives (Bontis, 2001). At their best, these leaders are able to align KM to the company’s strategy and objectives, demonstrating how good KM practices can help an organization achieve its goals. Leaders at Xerox, for example, embedded KM into the organization’s business strategy by identifying knowledge sharing as one of the company’s “cultural dimensions” and adding it to the Xerox Management Model, the company’s business management process (O’Dell et al., 2003).

When considered through the lens of Multipliers, KM leaders demonstrating these skills are acting as *Challengers*. Their vision—especially when pursued in an organization with little in the way of formal KM—is a challenge extended by the leader to the organization. The leader identifies KM as an opportunity and works to create the conditions by which individuals at all levels of the organization can stretch to meet that opportunity and make the leader’s KM vision a reality.

In addition, strong KM leaders understand that metrics matter; success means demonstrating the value of KM in improving innovation, profitability, operational excellence, and other areas valued by the organization (KMM, 2001; Sayyadi, 2019). To *Challengers*, these metrics represent targets to be achieved, and such targets can be embedded into employee performance expectations, project management frameworks, and more, while still giving the employee the freedom to solve problems himself/herself. The KM team at Goodyear, for example, demonstrated the value of knowledge mapping and learning journals by using surveys and metrics to show how these knowledge tools have standardized training, improved collaboration across regions, and shortened “time to competency by an average of three months for new hires across various technical roles” (APQC, 2018, p. 9).

Pfizer CEO Albert Bourla speaks in a *Challenger* voice in describing how employees were encouraged to try new ways of approaching a problem in fast pursuit of a COVID-19 vaccine:

*When you set a huge goal, you must encourage the out-of-the-box thinking required to achieve it. What worked in the past won’t build you a new reality. In the spring of 2020 various teams presented senior*



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*leaders and me with multiple ideas for solving particular problems: “One, two, three. This is what has been done before.” We kept asking them for a fourth, fifth, and sixth choice, and creatively, they complied. After a few months it became a habit. People brainstormed new options on their own. (Bourla, 2021, para. 34)*

Effective knowledge leaders also understand they must build strong teams in order for KM to be successful in an organization (Wiig & Jooste, 2003). “Teams” in this context must be understood in the broadest sense of the word; these are the KM departments, but also the C-suite executives, the KM champions circulating in other areas of the organization, the teams’ created by strong relationships forged between KM and other disciplines.

This emphasis on collaboration and cooperation is the *Talent Magnet* at work. In the KM context, leaders with this skill attract talented people to help the leader achieve their vision. This is in part because, no matter the employee’s level of expertise, they know they will grow and progress in their career under the guiding hand of the *Talent Magnet*. A superpower of the *Talent Magnet* is the ability to uncover unrecognized as well as future knowledge leaders, knowing that “leadership is a process accessible to everyone, not a trait or characteristic reserved for a select few, with potential to transform followers in a positive way” (Shuck & Herd, 2012, p. 162).

*Talent Magnets* identify those who may already be sympathetic to the cause, and work to build partnerships with those who are not. These leaders and their teams design and build practices that coordinate KM activities throughout entire organizations, then influence, inspire, and motivate those around them in order to encourage participation and produce cultural change (Adams, 2001; Birasnav, 2014). Jean-Claude Monney, former CKO at Microsoft Enterprise Services, showed *Challenger* and *Talent Magnet* skills when he leveraged change management principles in order to sell KM and encourage adoption. He secured leader buy-in and embedded KM into all aspects of Microsoft’s business, understanding that “KM should focus on how individuals can rapidly grow knowledge and skills to move into a new task” (Dixon, 2017, para. 4). Monney encouraged apprenticeships and ongoing learning as a way for employees to move up and around throughout their careers. He built strong business relationships, aligning KM to corporate metrics around quality, revenue, and customer service, and incentivized desired behavior through rewards (Garfield, 2017).

Strong knowledge leaders who are *Talent Magnets* also relish the opportunity to grow intelligence outside of the organization by building relationships and sharing knowledge with the broader KM community. They model exemplary behavior by encouraging open dialogue, cross-discipline engagement, and the exchange of ideas (O’Dell et al., 2003). Ed Hoffman, former CKO at NASA, joined APQC and the Federal KM Community (which includes the Internal Revenue Service (IRS), military, Federal Bureau of Investigations (FBI), and other intelligence agencies) in order to share knowledge and learn from other organizations doing similar work, and to show his own organization that KM was bigger than NASA (Garfield, 2017).

When KM leaders participate in knowledge sharing like this, each party is investing in the success of the other, using learnings to help amplify their own organization’s success. Andrew Gent—who led technology projects for the HP Consulting & Integration KM team—demonstrated this internally by leveraging HP’s KM Community to generate discussion around the idea for a new rewards program at the company. This feedback was used to produce a program that incentivizes employees to take ownership of their work by gamifying knowledge sharing (Garfield, 2017). Beyond fostering a “by us, for us” sentiment among employees, this approach allowed knowledge leaders to take a step back. Rather than

herding employees toward established targets, leaders at HP created the conditions that empowered employees to stretch toward those targets organically, through the spirit of competition. In this way, these leaders demonstrated the skills of an *Investor*.

These individuals foster a supportive learning culture by proving themselves to be continuous learners, mentors, and teachers (Earl & Scott, 1999). They teach others about good KM practices in order to step back and let them apply KM on their own. They create the conditions in which individuals must take ownership of the management of their knowledge assets, whether by embedding KM technologies and processes into employees' everyday work experience or incorporating knowledge sharing into employees' performance evaluations. At Johnson & Johnson, the knowledge networks established by Michael Burtha (former Director of Knowledge Networks) included the creation of "Knowledge Fairs" or "Knowledge Exchanges" as informal gatherings to encourage knowledge sharing among employees (Sedighi & Zand, 2012). Leaders at Texas Instruments have taken a similar approach by establishing ShareFair events that encourage knowledge sharing and best practice transfer (Johnson, 1997).

However, when taking ownership of the management of knowledge assets is considered literally, it can prove detrimental to KM efforts and costly to the organization. Like many companies, General Electric's (GE) Global Research Centers prized the organizational knowledge of their long-standing employees. It was so valuable that, when these employees retired, GE often hired them back as consultants, at twice the pay. Because this system was lucrative to employees, it perpetuated knowledge hoarding—a characteristic of diminishing *Know-It-All* behavior. Seasoned employees were unwilling to mentor successors because giving away their knowledge meant giving away their future income. GE realized it had to change the system because "it was essential to pass on to the next generation of scientists and engineers, those deep smarts that had led to thousands of patents underlying GE's products and reputation" (Leonard, 2014, para. 6). As a result, leaders worked to convert a knowledge hoarding culture to a knowledge sharing culture. The end result reflects the *Investor* trait, multiplying the intelligence of the organization because employees coaching and mentoring less tenured employees is now a part of their role (Leonard, 2014).

Ultimately, by teaching and training others, and creating an environment in which knowledge is valued, managed, and leveraged at all levels of the organization, *Investors* are impactful KM leaders who understand that success means planned obsolescence, or, as David Owens of St. Paul Companies expressed:

*Managers will be able to do this on their own, because of the work I've been able to do with the help of my colleagues...These systems and processes help people know who can help and where to find additional knowledge. And I help people understand why they need to do this. (KMM, 2001, p. 6)*

What the above-mentioned skills and behaviors demonstrate is that effective KM leaders are capable of great influence. Through a combination of business acumen, social skills, and genuine enthusiasm, they are able to garner executive sponsorship, motivate employees, accelerate innovation, and influence change in the organizational structure and culture (DeTienne et al., 2004). Leaning into the multiplier trait of the *Debate Maker*, KM leaders amplify their success by leveraging the collective intelligence of the organization in order to make the best decisions for it, rather than deciding alone.

To do this, *Debate Makers* encourage cooperation, curiosity, open communication, and healthy debate. They invite contributions from a wide spectrum of the organization, gathering data from a variety of sources, and encouraging dialogue and intense interaction in order to turn that data into new knowledge which can contribute to organizational learning and inform decision making. At NASA's Goddard Space Flight Center, for example, former CKO Edward Rogers created a knowledge exchange working group,

## **Knowledge Leaders as Multipliers**

consisting of Rogers and representatives from each of the organization's directorates in order to share and evaluate project lessons to be included in the Goddard Knowledge Exchange database (APQC, 2017).

Taking a shortcut to a decision without gathering and analyzing all the data is diminishing *Decision Maker* behavior, and can put a knowledge initiative at great risk. For example, before the launch of Eureka, Xerox's knowledge asset, leaders wanted to incentivize employee contribution to it by offering compensation as reward. Fortunately, leaders discovered ahead of launch that this decision would not secure the buy-in of employees, putting the initiative in jeopardy. Their next step was to scrap their decision and consult with employees instead, which leans into a Multiplier zone: the *Debate Maker*. This led to the implementation of a peer review system, an outcome that could only have been arrived at because leaders consulted with and listened to their employees (DeTienne et al., 2004). These kinds of activities contribute to creating a culture that favors knowledge sharing and integration, two elements that are critical to successful KM.

However, effective knowledge leaders understand that in order for knowledge sharing and reuse to flourish, there must be a high degree of trust between individuals and within the organization (De Long and Fahey, 2000). Knowledge leaders acting as *Liberators* produce high trust environments. They create a safe space in which people feel free to think creatively, try new things and share their ideas. To a certain extent, trust starts being built when knowledge leaders are able to clearly communicate their KM vision: "Having a clear business objective - really understanding the why behind the change - it's so important," says Jean-Claude Monney. "The most important thing we need to do is to start with [...] awareness, and have a crystal-clear message" (Prosci, n.d., para. 12). When employees understand what KM practices will achieve and why they are critical through messaging delivered by leaders who model the KM values they promote (capture, sharing, application), it becomes easier for those individuals to trust in the legitimacy of the initiative and contribute their best efforts to it.

A way in which KM leaders prove themselves to be *Liberators* is by encouraging a fail-forward organizational culture, or rather a culture with an openness to learning such that it encourages people to admit and share their mistakes so that others may learn from them. Ford Motor Company's Best Practice Replication (eBPR) process, for example, was implemented as a way of capturing, sharing, and leveraging high value practices in order to accelerate production and improve quality. A highlight of this method is that users have been encouraged

*to document their whole experience—both successes and failures. The communities wanted a place to put lessons learned so that mistakes were not replicated...This is a testament to the strength of the Ford culture that contributors are happy to relate and value those things that don't go well as those that do. (Wolford & Kwiecien, 2003, p. 509)*

In this environment, employees flourish as they are encouraged to explore and innovate; consequently, organizations prosper as they reap the benefits of employees' curiosity and creativity.

## **CONCLUSION**

In order for KM to thrive, an organization requires a specific combination of conditions working in tandem that form the runway from which a KM initiative can take off. Although there is some disagreement in the literature about those conditions—what they are, how they should be combined, and the relative

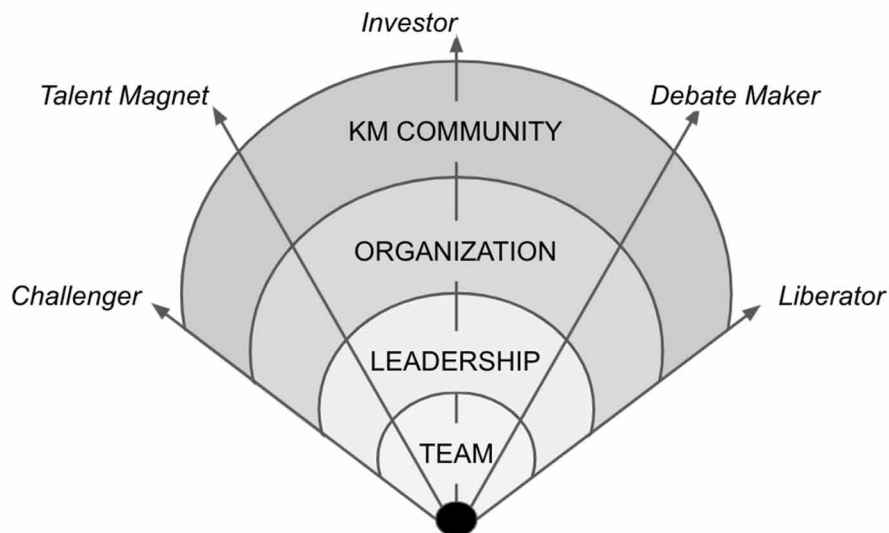
importance of each—there is general agreement that technology, HR, organizational culture, and leadership are among the key enablers of successful KM.

IT provides the material infrastructure which underpins many of the practices that are central to KM. HR are the people who engage in these practices, the workers whose knowledge is central to the entire process. Organizational culture is the context in which these people operate, the immaterial infrastructure that encourages them—through messaging, incentives, communities, and opportunities—to share, participate, and learn. Finally, leadership is the guiding light that provides direction, leads by example, and advocates for KM. The mere presence of these enablers is not enough; in order for KM to thrive, they must be mutually supportive, working together to smooth the way for KM to flourish in an organization.

In order for a person to be an effective knowledge leader, he/she must possess skills that encourage knowledge-supportive practices (e.g., communication and collaboration). He/she must role model desired behavior (e.g., knowledge sharing) by showing that he/she himself/herself engages in those practices (e.g., collaborating inside and outside the organization). In addition, he/she must garner support in order to create the conditions for others to feel empowered enough to adopt those practices. Described through the language of Multipliers, it means that strong knowledge leaders are *Challengers*, because they create a compelling vision of what KM can be and do for an organization, and then challenge the organization to rise to the occasion.

They are *Investors*, because they invest in the organization by teaching good KM practices, sharing their expertise in order to create new knowledge leaders and maximize their impact. They create the conditions for employees to take ownership of managing their knowledge. Their investment extends beyond the organization as well; effective KM leaders participate in the broader KM community, sharing their knowledge with others while simultaneously learning from them, then bringing those learnings back into the organization.

*Figure 1. This figure illustrates how the skills of a knowledge leader are amplified beyond themselves and their own team when coupled with the traits of Multipliers.*



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They are *Talent Magnets*, because this behavior allows the leader to build strong networks and strong teams; people are attracted to the leader's vision and compelled to participate in KM in order to advance their own learning and success. Finally, strong knowledge leaders are *Debate Makers* and *Liberators* because they understand that, in order for knowledge capture, sharing, and application to be most effective, they must take place in environments that encourage collaboration, healthy debate, the freedom to make mistakes, and the ability to learn from those mistakes.

As a result, knowledge leadership is leadership that resonates with and multiplies the intelligence of the organization (Figure 1). It may stem from the talent and influence of the leader, but it reverberates throughout an organization through the tools, processes, and practices it has implemented, the communities it has created, the people it has empowered, and the resulting knowledge it has amplified into innovation and impact.

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## KEY TERMS AND DEFINITIONS

**Diminisher:** A leader whose behavior limits the capability of their employees.

**Knowledge Leader:** Someone widely acknowledged to be driving and influencing the adoption of knowledge-supportive practices and values within an organization.

**Knowledge Management Enablers:** Elements which support, facilitate, and stimulate knowledge management practice within an organization.

**Knowledge-Supportive Practice:** An activity which encourages and supports knowledge discovery, organization, sharing, reuse, creation, and/or acquisition within an organization.

**Knowledge-Supportive Value:** An organizational principle or standard which encourages and supports knowledge discovery, organization, sharing, reuse, creation, and/or acquisition within an organization.

**Multiplier:** A leader whose behavior maximizes the capability of their employees.

**Organizational Culture:** An organization's collected practices, values, and beliefs, which are communicated to all employees and influence their actions.

**Transactional Leadership:** A style of leadership which uses reward and punishment to motivate employees.

**Transformational Leadership:** A style of leadership which uses idealized influence, inspiration, and intellectual stimulation to motivate employees to make positive change within an organization.

# Chapter 4

## How the Best Companies in the World and Their Employees Are Winning With Knowledge–Driven Cultures

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### **ABSTRACT**

*When a company encodes the creation and maintenance of knowledge into its values and behaviors in a way that supports continuous improvement and learning, they are truly knowledge-driven. These knowledge-driven organizations are proven to be better at making decisions. When companies make better and more transparent decisions, their employees are more engaged, and their customers are more successful. Ultimately, knowledge-driven cultures increase revenue, bring products to market more efficiently, streamline internal communications, and onboard new hires faster. The best companies in the world operate this way – learn how they do it.*

### **INTRODUCTION**

“Knowledge is power,” a quote accredited to Francis Bacon in the 16th century, has moved from insight to cliché. In fact, one could argue it has taken on an interpretation that is the opposite of the one Bacon intended. Bacon, a philosopher known as an ardent proponent of humanism—which champions the equality of all human beings—believed not only in the power of organized, repeatable, empirical knowledge but also in its ability to improve the human experience.

Implicit in “knowledge is power” today is a sense of hoarding that knowledge for one’s own personal benefit, or power. While that might often be a successful strategy on a micro-level, the broader

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success of modern organizations is contingent on reimagining what knowledge can mean on a macro level. World-class organizations promote cultures of knowledge sharing, creation, and collaboration—leveraging their collective knowledge to empower people to drive towards better outcomes as a unit. In a knowledge-driven culture, information is not hoarded or siloed - it is applied and shared across every decision made in an organization.

So, what are the definitive characteristics that separate good companies from great companies? In analyzing and collecting data from some of the fastest growing and most successful companies in the world, a non-obvious answer might start to emerge. Could it be culture—or the very fabric of a company and how they operate that is the biggest indicator?

The term “culture” might draw on the importance of a values-driven culture, which refers to the ideals that a company expresses and reinforces as an entity. But there’s a facet of culture that these companies in the world have begun to embrace, and it is that of a knowledge-driven culture. The companies that understand this not only embrace it, they hold it as a core pillar to how they operate as a company. Knowledge is power for these organizations, and on a collective level.

This chapter will review current challenges facing organizations today that are preventing them from leveraging the knowledge they have to be as effective as possible. In addition, it will examine some of the negative consequences organizations face as a result of under-investing in knowledge. Research from fast growing organizations will be shared, and the four components of a knowledge-driven culture will be shared and discussed.

## **BACKGROUND**

Organizational culture has an impact on many outcomes within an organization, and the success of knowledge management initiatives is no exception (De Long & Fahey, 2000). Organizational culture has been defined as the values, views, and operations that are defined over time amongst a group (Schein, 2017). It influences the outcomes with the organization by defining acceptable practices, behaviors and conduct. For new processes to be adapted by the organization, they will either need to conform to the existing culture in place, or the culture will need to be adapted to accommodate the new process. The culture will shape how individuals create, use, and share knowledge (De Long & Fahey, 2000). In the case of knowledge management, a culture that supports knowledge-sharing and knowledge re-use will be required. Companies that have successfully implemented knowledge-sharing and other knowledge management practices see this as a critical way for their company to solve problems and reach their goals (McDermott & O’Dell, 2001). In a culture that prioritizes knowledge sharing, the opposite behavior, knowledge hoarding, is seen as a violation of the culture and is not tolerated (McDermott & O’Dell, 2001).

## **THE TRENDS DRIVING THE NEED FOR KNOWLEDGE-DRIVEN CULTURES**

There are many recent trends highlighting the need for knowledge-driven cultures. Over the last several years, a lot of changes have led companies to recognize this as critical and central to how they operate. The first is the rate of change within an organization. One clear way to see that rate of change in action is to examine product development. Almost every organization builds some sort of product and releases it, whether it is physical or digital. With each release, all the information surrounding that product and

how it was built is changing as well: What the product does, with whom the product competes, and how to position against the competition—that knowledge is changing faster than ever before, because products are being built and released faster than ever (McKinsey & Company, 2021).

The next trend is SaaS app proliferation. Employees work in more and more places, browser tabs, applications to do tasks - applications they use to communicate with each other, and applications they use with their customers, like chat and ticketing tools.

As this SaaS proliferation only stands to increase, so too does this problem. In fact, the average employee switches between 35 job-critical applications more than 1,100 times every day (PEGA, 2018). Every time an employee changes a window or moves into an application, there is a productivity tax that comes with that. The knowledge they need to do their job really should not be buried among so many tabs and windows. In fact, this context-switching results in up to 80% of lost productivity (MacKay, 2021).

The third trend is perhaps the most obvious. As far back as 2019, there was a lot of talk about remote work policies, which simply means that for some portion of a given workweek, some percentage of employees are not in an actual office. They are working remotely, working from home. There are many companies that have been remote-native from the beginning, embracing this as a means to recruit better talent and afford those employees more flexibility. They intentionally designed their teams and organizations that way.

In 2020, many organizations were thrust immediately into a remote work context due to the Covid-19 pandemic, and it has had fascinating implications and changes as a result. At a minimum, the hybrid working model will likely end up being a permanent change, as it turns out that employees are fairly productive in a remote context, particularly now that companies have adopted the policies, processes, and technologies needed to make it work. In fact, Forrester predicts 70% of US and EU companies are planning a full shift to hybrid work (Forrester, 2021).

As more and more companies adopt these hybrid working models—or fully remote work policies—the way organizations work will change, but there is a lot of opportunity. With teammates now in different time zones, offices, and homes, the inability to walk up to someone’s desk to ask them a question, get in a meeting with someone in-person to collaborate or problem solve is removed. Synchronous collaboration, in this context, does not work. One of the lessons learned in 2020 is that asynchronous work can not only create thoughtful and productive collaboration, removing the feeling of real-time immediacy in our day-to-day work but it can also make jobs more flexible and less stressful.

If employees are able to work without frequent interruptions from well-intentioned colleagues seeking to collaborate or speak with them, people can start to operate in a more asynchronous mode. Documentation and proper knowledge management are crucial in facilitating this. In order to accomplish productive, asynchronous work and reap all of the benefits, companies need to build a culture of writing things down – things like how products work, how markets work, and all the things that companies need to do in order to operate and make good decisions.

Equally critical, however, is the flip side of this culture. If the employee seeking information has a question, they must also commit to finding and using that documentation, rather than “shoulder-tapping” the person they think may know – albeit digitally or in-person.

## THE NEGATIVE CONSEQUENCES OF UNDER-INVESTMENT

### Impacting the Employee Experience

What happens when investments are not made in knowledge? In a tweet, this (Nangle, 2019).

*Figure 1.*



**Christine Nangle** ✓  
@nanglish

Today a customer service worker gave me very wrong info (in an effort to help), then I ended up interacting w/him again hours later (after wasting several hours) & I told him he had given me the wrong info & he yelled at me. Just flat out yelled at me like I was his kid.

5:06 PM • Sep 19, 2019 • [Twitter Web App](#)

Unfortunately, bad customer service experiences are common: flights get bumped and the agent at the counter cannot help or a return is rejected because the original purchase was a sale item. Unfortunately, this kind of bad publicity travels much faster than positive experiences. These stories resonate so acutely because it is a personal pain commonly felt.

In this example, someone was given the wrong information, and that had an impact on the brand and customer experience. In a knowledge-driven culture, these scenarios—both internal and external—are avoidable. When there is a commitment made from the top that knowledge is important, that knowledge is systematized and incorporated into how teams work together, and it is built into the culture of the company, the company makes better decisions, and these scenarios are less likely to happen.

An otherwise well-intentioned agent is subject to a systemic failure that resulted in an inability to do a job because this agent could not get the knowledge needed to do that job. The confidence and sense of autonomy employees need to feel was absent, because the system on which they rely is broken. How do employees want to receive the information to do their job? Do they want to have to “shoulder-tap” the one subject matter expert who worked on that project or product, the same one who has likely been approached many times already? This scenario can leave employees feeling disempowered, and it also creates a poor customer experience that damages the brand and the business. The trickle-down does not just exist externally. Internally, this subject matter expert who is fielding the same questions again and again cannot focus on their job either. The employee experience is deeply compromised on multiple levels, and as a result, the customer experience is as well.

In fact, Forrester lists “lack of access to task-critical information” as one of the top reasons employees burn out (Johnson et al., 2019).

## **Creating an Uneven Playing Field for Employees**

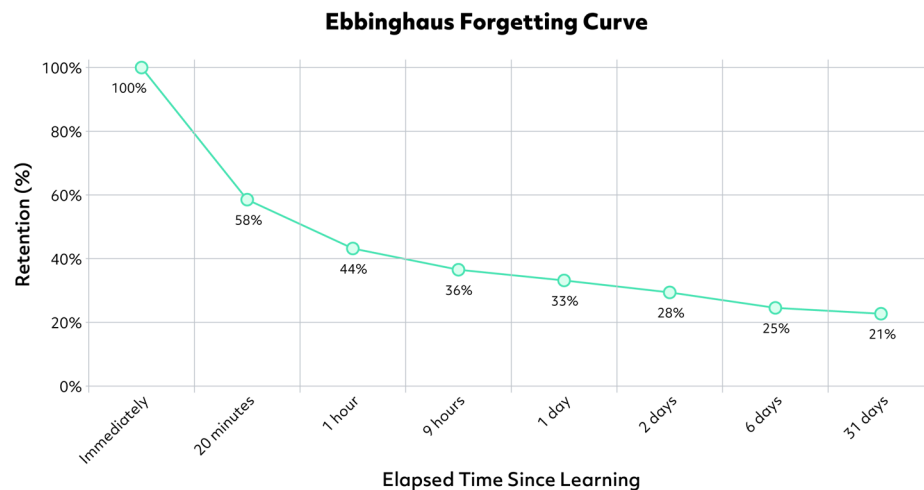
In addition to employee engagement, a lack of a knowledge-driven culture can also create an uneven playing field from a gender, race, and ethnicity standpoint. When knowledge is hoarded for personal gain, it is often done by people in a position of power in an organization. This gives them a distinct advantage over other employees while simultaneously making it difficult for others to effectively work.

When organizations make this information tough to access, opportunities are not granted equally.

## **Lengthening New Hire Onboarding Time**

Onboarding new hires can be expensive, time-consuming, and oftentimes, inefficient. Much of this can be attributed to the way people learn and process information. According to the Ebbinghaus Forgetting Curve, employees lose 79% of what they learn just 31 days after they learn it (Shrestha, 2019). Unless this information is continually reinforced, Ebbinghaus posited that people will lose their ability to retain it.

*Figure 2.*



When information is challenging to find and is not reinforced, it takes longer for new employees to reach full productivity, which estimates suggest is 8 months (Friedman, 2020). During this ramp-up time, companies are not just paying for training new employees, they are also paying existing employees to continue to help them onboard.

Even more concerning is the statistic that up to one third of new employees start looking for new job opportunities within 6 months of their hiring date. This cost is substantial for organizations (Hireology, 2021).

But why do these employees actually leave? Beyond the basics of salary, benefits, and location, the primary reason employees leave is lack of job satisfaction. A leading correlator with job dissatisfaction is employee engagement (Gallup, 2021).

## **Contributing to Noisy and Inefficient Communications**

Internal communications, or the practice of keeping employees connected, informed, and engaged by creating a shared understanding of company goals, values, and ongoing projects, is a critical consideration for a knowledge-driven culture. But how exactly do internal communications intersect with a knowledge-driven culture? And how has this evolved over the last few years?

Communicating effectively within an organization has always been important, but it has gained a whole new meaning now that employees are no longer together in the office every day. Organizations must intentionally try to foster connections that occurred naturally in the office, and this is more difficult to do in a remote environment (Sawatzky & McBride, 2020).

With more and more communications being conducted virtually, finding the signal amid the noise is challenging. By optimizing knowledge for the consumer of that knowledge itself – rather than the author – companies can ensure employees can find the “need-to-know” knowledge more quickly and efficiently. As knowledge is created in chat and video tools hundreds of times a day – and as companies try to keep pace with all the change– optimizing for the consumers of knowledge becomes increasingly important.

## **SOLUTIONS AND RECOMMENDATIONS**

### **Research Information**

In 2020, a commissioned proprietary research project was conducted in an effort to assess knowledge-driven cultures. Included were surveyed company leaders and individual contributing employees across organizations from various industries like consumer goods, business services, financial services, software as a service (SaaS technology), and e-commerce.

- Fieldwork conducted March 2020
- Respondents recruited from a representative research panel conducted in the United States
- Sample: Total sample ( $n = 612$ ) includes 307 business leaders and 305 individual contributors, meeting the following criteria:
  - Principal business involving e-commerce, financial services, consumer goods, business services, direct to consumer, or SaaS technology
  - Companies with 100 to 2,500 employees

Combined with studying some of the fastest-growing companies in the world, this chapter will compile a perspective through examining this research data, surfacing insights, and sharing stories of companies on this journey of what it means to have a knowledge-driven culture.

The research suggests knowledge management can be a significant lever to drive business performance. More importantly, these findings are mostly about culture and the people who embody it, exploring how knowledge management activates company values and supports behaviors. Ultimately, this is about how



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to bring collaborative knowledge creation and knowledge sharing closer to the center of company culture by examining research data, and insights, and sharing stories of companies that know what it means to be knowledge-driven (Guru, n.d.).

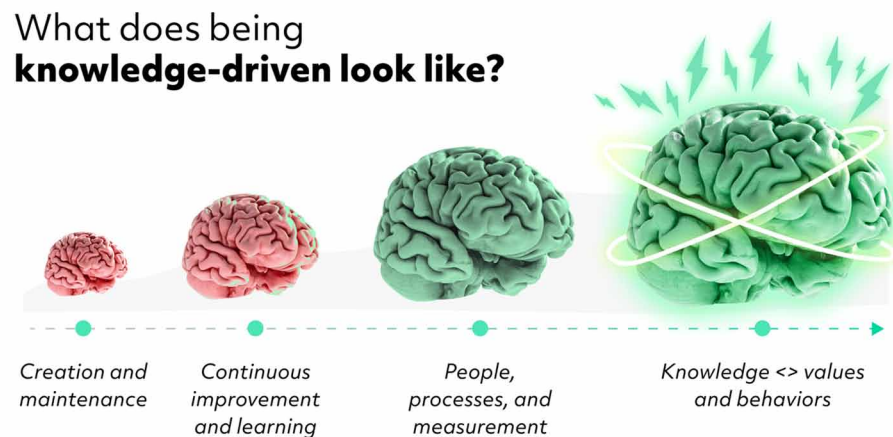
A knowledge-driven culture is one that encodes the creation and maintenance of knowledge into its values and behaviors in a way that supports continuous improvement and learning, along with supportive notions of people, processes, and measurements.

There are four components of a knowledge-driven culture, outlined in this chapter. In addition, this chapter will detail some common use cases that stand to benefit most from establishing a knowledge-driven culture, as well as a maturity model to assess where an organization might currently be relative to being truly knowledge-driven. Lastly, there will be an explanation for the how and why behind the rise of knowledge-driven cultures and speak to the negative consequences associated with under-investing in building a knowledge-driven culture.

### The Four Pillars of a Knowledge-Driven Culture

This section begins by breaking down the four components and assessing how they build off one another to permeate the entirety of an organization.

Figure 3.



To start, an organization must commit to capturing and maintaining knowledge. With the rise of applications, including chat and video tools, knowledge is being created constantly. It is critical that knowledge is not lost or forgotten entirely. Capturing this knowledge as it is shared and created is critical. Put simply, can an organization make the commitment to writing down and documenting critical knowledge.

*Think about day-to-day business in your organization. Somewhere in the complex mixture of experiences, relationships, conversations, and documents lie some simple powerful insights—insights which have commercial value and should be made easily accessible to others (Collison & Parcell, 2004, p. 235).*

## ***How the Best Companies in the World and Their Employees Are Winning With Knowledge-Driven Cultures***

While capturing knowledge may seem simple enough, there is a lot of knowledge that lives in peoples' heads or in informal settings. Failure to document this knowledge creates a risk of perpetuating a hive-mind knowledge culture that siloes and restricts access to knowledge, in turn alienating employees.

Once a commitment has been made to creating a culture of documentation, the next pillar is around continuous improvement and learning. In this area, there is a commitment to ensuring that the knowledge captured in the prior step is maintained and improved over time. Improved means that the organization commits to making sure that the knowledge stays accurate as information changes. Failure to keep knowledge accurate and up to date will impact the confidence in that knowledge. A lack of confidence in that knowledge will diminish the adoption and usage of that knowledge.

But the commitment needs to be widespread and built into the culture. As Milton and Lambe (2020) posit, without the cultural commitment to making this important across the business, organizations will only see roughly 20% adoption of knowledge maintenance and management.

*If you introduce KM as a voluntary activity, you only reach 20%. Many organizations have found this to be a typical sort of adoption rate when internal use of social media such as blogging, and microblogging is introduced "bottom-up." Adoption does not spread beyond the enthusiasts, 80% of the organization remains uninvolved, and so 80% of the knowledge remains untapped and unmanaged (Milton & Lambe, 2020, p. 193).*

The third pillar includes people, process, and measurement, and an understanding that knowledge-driven culture requires everyone to play a role. A knowledge-driven culture is bidirectional - from the knowledge creators to the employees who need accurate and up to date information, everyone is responsible for ensuring knowledge is used and reused.

Across an organization, there are different departments that all create valuable knowledge that other teams need and rely on to do their jobs. Companies must organize themselves to make this happen in a scalable way and they require the willingness and intentionality to measure the efficacy and impact of this knowledge. One way organizations solve for the coordination of these efforts is to build "knowledge councils," or a group of cross-functional stakeholders who organize and strategize knowledge management across the company. And as far as the measurement of the impact, tying the creation and use of knowledge to specific outcomes based on our individual team or company goals is critical.

When these three pillars of a knowledge-driven culture have been established, the next and last step is to commit to creating an open, transparent, and information-sharing culture. This begins with leadership, who need to weave this idea into the very fabric of how the company operates. When leadership is talking about the company, it needs to be communicated that it is important to the company that the employee will write down what they know and that the company operates as an open, transparent information-sharing culture. If leadership is not bought in and creating this culture themselves, often these efforts will fall short. This point is an important one—historically, knowledge management is viewed by leadership as being nice to have, rather than being a necessity (Trees, 2018).

But why does knowledge management tend to take a back seat? Why can it be so difficult for leadership to not only understand its importance but prioritize these efforts?

For starters, knowledge management can be difficult to measure and, therefore, reward. For example, when a product is built, what was created and by whom can be easily attributed to the correct party. Or, when a team closes a sales deal, it is clear how much revenue was generated, as well as who was responsible for driving that revenue. One of the challenges with being truly knowledge-driven as an organization

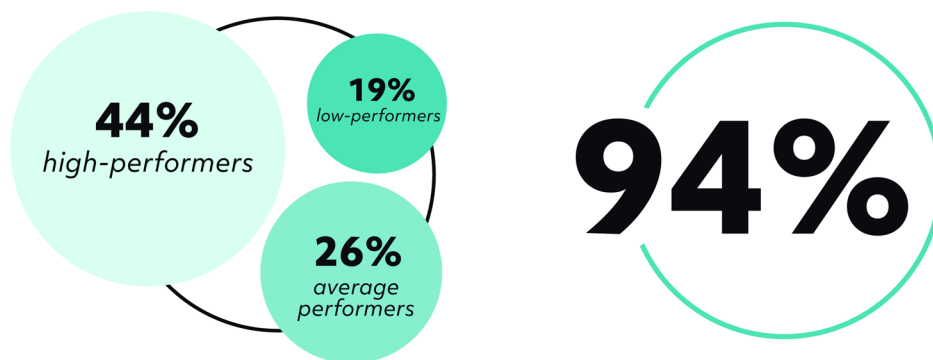
is the fact that it is not as obvious as other things companies do. Knowledge sharing is amorphous and harder to quantify unless an organization actively take steps to do so. Being knowledge-driven is just as critical as so many other endeavors companies take on, so why not reward it and recognize the same as those other endeavors?

## **The Impact of Knowledge on Decision-Making**

If employees making decisions have accurate information available, not only do they make better decisions, but these employees will be more engaged and connected to the company itself (Guru, n.d). The knowledge-driven company has employees within that company who feel empowered and confident when they are talking to their customers, and feel efficient and productive, which leads to more engaged employees, and that leads to happier customers.

The research focused on asking participants to identify if their company was meeting top-line business goals to assess “high performers,” which was a self-assessment. Individuals responding that their organizations were in fact meeting business goals were much more likely to say that they had good decision-making cultures.

*Figure 4.*

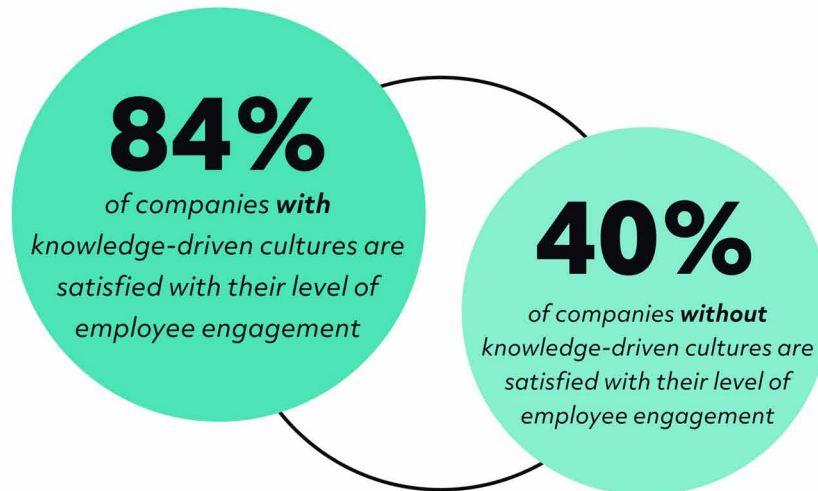


94% of the companies with self-described knowledge-driven cultures exceeded their growth expectations. Combined, there is a strong correlation and an impactful example of what happens when companies create a knowledge-driven culture. Once organizations start committing to capturing knowledge and keeping it accurate as a company, companies tend to make better decisions. When all the decisions that are made across the company are added up—some of which might have massive implications for the overall business—the value of documentation becomes clearer.

## **Knowledge-Driven Cultures in Action**

In examining some companies that exemplify certain pillars of knowledge-driven culture, a few stand out.

Figure 5.



### **Noom: Creation and Maintenance**

Few demonstrate knowledge-driven culture quite like Noom ([www.noom.com](http://www.noom.com)), a mobile-based wellness program that encourages long-term, healthy eating habits. Although they exemplify all four pillars of a knowledge-driven culture, the creation and maintenance pillar is really where they have innovated. In some ways, Noom's knowledge-driven culture was born out of necessity, as it has a rapidly growing coaching team that more than doubled in 2019.

Noom's nutritional coaches help their customers make better-informed decisions around nutrition. Interestingly, this team has always been remote-first, with all coaches working from home. The reason this pillar really stands out with Noom is the way it was designed for this type of scale and break-neck speed. Every piece of information has been captured and documented thoughtfully, with the consumer being of primary concern.

What does this entail? For starters, there may be a lot of context around the knowledge that is necessary that their health coaches have, but the consumer of the knowledge does not. Ultimately, Noom is authoring knowledge for the sake of its usage, not just to manage and store that knowledge. That is what a knowledge-driven culture looks like. Noom wrote everything with the consumer of the knowledge in mind. Think about the context surrounding the writing: Is the author using jargon that might not be universally understood? Is there sufficient context in order for this writing to make sense to someone, or is the author linking to external sources so someone can easily get up to speed? Noom demonstrates this, ensuring content is impactful and useful.

Writing in a predictable, clean, and simple structure increases one's ability to consume that knowledge easily. Noom also leverages templates for consistency so that the team is reading the same type of knowledge, and it looks the same. Cognitively, it helps the reader absorb information faster to be consistent. From the beginning, Noom has made a commitment to maintenance, to ensure its knowledge is fresh and up to date, with continuous improvement in learning. With Noom, the commitment is to

the continued accuracy of the knowledge that is being captured and to getting feedback concerning its efficacy from the actual consumers: what is working and what is not.

## **Zoom: Continuous Improvement and Learning**

People learn in different ways, and employees have been subjected to lots of different contexts growing up. Zoom (<https://zoom.us>), provides a video conferencing tool, and has notably embraced this idea, all while building and scaling a category-leading product to enable people around the world to stay connected.

Zoom has taken a very thoughtful approach around its knowledge-driven culture, and in particular pillar two with a commitment to continuous improvement and continuous learning in their organization. Zoom's foundation stems from the belief that people retain about 20% of what they learn in an initial course. As such, continuous learning and reinforcement are critical to the success of getting something to stick.

Zoom has identified what they call *macro-learning* and *micro-learning*. For macro-learning, a learner needs a bigger concept, followed by a guided learning path. With micro-learning, in-the-moment reinforcement needs to be provided. Each one of these have different techniques for success.

There is a lot of intentionality around how people learn things, what they need in support of that learning, and how they ultimately can reinforce that learning along the way to make sure it is maintained. They will then record a video and then put it in a specific place where it is needed to understand that specific step, and they will push this information out via their knowledge management system in context. If it is new information and it is a big topic, a learning management solution and course will be a great solution for that. If it is something that was taught that needs to be reinforced, searchable tutorials allow for pulling things up easily to be reminded of what a given thing is. This is a tremendous example of the idea of continuous improvement in learning in action.

## **Square: People, Process, and Management**

When reflecting on pillar number three: people, process, and management, how companies organize themselves to facilitate a knowledge-driven culture is paramount. Specifically, are the right partnerships being created across the organizations. This requires a long-term mindset and far more than a "set it and forget it" mentality. Square ([www.squareup.com](http://www.squareup.com)), a financial services and mobile payment company, has a large portfolio of products offered to businesses and to support their sellers. Square reflects this people, processes, and measurements pillar. Although they, too, have mastered all four pillars of a knowledge-driven culture, Square stands out as a particularly great example of this pillar in action.

At Square, there is a comprehensive set of knowledge across those different products in order to be successful. Square has most notably succeeded in creating a partnership between the company and its employees, recognizing that it is not a team problem; it is a company opportunity. As teams grow rapidly, Square has been keen to centralize knowledge across silos, ensuring teams are using a single system to retrieve the large swaths of information, all while having a singular view into all the knowledge they need.

Even in a knowledge-driven culture, there could be people acting with the best of intentions trying to contribute knowledge that might already exist, resulting in redundant or inconsistent information. It is important that companies prevent that from happening, all while encouraging the contribution of knowledge, and Square strikes this balance. Square scales and keeps that knowledge consistent, clean, accurate, and updated by establishing directly responsible individuals, subject matter experts within the

company who are committed to facilitating simple rules regarding how that knowledge will be captured and the best practices regarding formatting, how that knowledge is shared, and who should have access to it. The team at Square collaborates, leveraging each other's experiences as a resource. Imagine these subject matter experts becoming directly responsible individuals from different departments within the company, each responsible for their respective topics of knowledge, which is how to ensure organization around a knowledge-driven culture.

## **Guru: Maintaining a Knowledge-Driven Culture**

Finally, with the fourth pillar of knowledge and integrating the knowledge and commitment into the fabric of the company, at Guru ([www.getguru.com](http://www.getguru.com)), the organization started capturing values in 2017. The company is intentional with how these values are reinforced and deliberate in connecting how those values can be lived by employees. The company incorporates being knowledge-driven into everything they do, including the company values. This commitment is made as a team, across all employees, to embrace, understand, and live by these values, even challenging the company if there is a sense of outgrowing a value or recognizing that they need to change.

This became a great opportunity to put the knowledge-driven commitment into that construct. The company established “seek and share knowledge” as one of the core values as a company, which means a commitment to transparency, sharing what is known, and seeking the knowledge of others, particularly those with diverse views and perspectives. The company believes that this is how they can operate best as a company and ensure this is built into the fabric of the culture as the company scales.

When knowledge is easily accessible, employees are empowered to do their best for their customers – and for each other. By doing so, companies are not simply managing knowledge, but empowering their employees to do their best for their customers—and for each other. Failure to do so will result in customers leaving for competitors and employees burning out and leaving. These outcomes are arguably the most critical, and therefore, knowledge-driven cultures should be, too.

While the benefits of knowledge-driven cultures are widespread, there are three primary benefits to highlight.

## **Boosting Diversity and Inclusion**

Knowledge-driven cultures can do more than drive better financial outcomes. When businesses promote environments where knowledge is openly shared and not hoarded, a more level playing field is created for all employees, regardless of background, ethnicity, or gender.

When organizations cultivate a knowledge-driven culture in which knowledge is centralized, transparent, and readily accessible, essential information is shared easily and people are granted more equal opportunities. Instead of having to seek out information by asking for it—or never knowing it exists to begin with—people are empowered to seek and share the knowledge they need to be successful. This helps level the playing field for every employee in an organization, regardless of tenure, seniority, or ethnicity. Overall, this can allow companies to make better, more informed decisions and promote inclusivity among employees (Plumhoff, 2020).

Imagine two scenarios for a new engineer that encounters a problem at work. In one instance, they are forced to ask another engineer for help and have to hope that they have time and ability to explain what they need. In another instance that takes place at a company that values a knowledge-driven culture, that

same engineer is empowered by having easy access to commonly asked questions and sifts through the company wiki to get help on their own. Knowledge-driven cultures do not just save the company time and resources and reduce key-employee risk, they ensure that employees do not fail or succeed based solely on their extroversion or connections (Plumhoff, 2020).

## **Reducing the Cost of New Hire Onboarding**

For new hires and seasoned employees alike, new hire onboarding can become a slippery slope. When a lack of a knowledge-driven culture leads to experienced employees being inundated with the same questions, their engagement drops. When their engagement drops, their willingness to contribute their expertise to the rest of the organization drops, which hurts new hires. Now not only are the experienced employees less engaged and less helpful, but new hires also take even longer to reach a point of productivity that has them feeling autonomous and engaged.

Knowledge-driven cultures actively combat these kinds of negative consequences, directly driving up engagement rates. In fact, companies with knowledge-driven cultures were more than twice as likely to report being satisfied or very satisfied with their levels of employee engagement (Friedman, 2020).

By establishing a single source of truth for all the information an employee needs to do their jobs, employees are both more autonomous and empowered to do their job. Furthermore, if organizations can build a culture of trust within that information, new employees will have all the tools they need to be effective in the moment they need that information, all the while not continually interrupting more seasoned and experienced employees with questions any time they need information (Friedman, 2020).

When companies can create an environment of informed, engaged employees who can act autonomously, the organization puts itself in a position to be successful. When companies think about the bottom line, this allows companies to save significant amounts of time and money on what it takes to make new employees engaged and productive.

## **Streamlining Internal Communications**

Communication and knowledge-driven culture intersect when the employee understands the action they are supposed to take and why the action matters. If the knowledge is optimized for the audience so that the employee is able to understand the intended action of the communication, that clarity reduces cognitive load and decision-making fatigue.

Virtual or otherwise, meetings are a closed, siloed way that people communicate. Documentation in a knowledge-driven organization helps people trust they will know what is happening in an organization even if they are not in the room where it happened.

And as videoconferencing continues to rise in prominence, the obvious truth is that it is not a perfect replacement for in-person conversations. Video fatigue may sound like an excuse for being tired of staring at a screen all day, but it is real. Videoconferences have physical, fatiguing effects on employees (Ramachandran, 2021). Not only is close-up eye contact intense and unnatural but seeing oneself during video chats constantly in real-time is taxing. Additionally, video chats reduce mobility and self-expression, and lastly, the cognitive load in video chats is higher as people must work harder to send and receive signals.

As already outlined in this chapter, application proliferation has intensified. In fact, eight in ten organizations fast-tracked some part of their digital transition in response to the current situation caused by the Covid-19 pandemic. Seventy-three percent of respondents agreed that working from home has

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increased their sense of digital communication overload. U.S. employees switch among 13 applications an average of 30 times a day (Asana, n. d.).

Lastly, context switching between multiple apps slows employees down:

*Every time the brain context switches it has to “load up” a new context and “unload” the previous one into its short-term memory. These changes can be jarring, and they sap cognitive load, depleting concentration, prioritization skills, and effective decision making (Asana, n. d.).*

Context-switching kills productivity and employee engagement (MacKay, 2021). If these context-switching moments are happening over 1,000 times a day, what does that do to the human brain? And how does that limit a person’s ability to not only stay engaged and productive, but continue to communicate effectively as an organization?

So how does a knowledge-driven culture solve internal communications problems? Knowledge, when documented and dynamic, can be the asynchronous complement to real-time communications. Real-time work is not feasible in today’s distributed workforce in the same way that it was in the office. Working from home comes with scheduling conflicts and priority shifts that were not common at the office. Here are three examples of internal communications workflows and the information required to establish a knowledge-driven culture in support of each:

- *Urgent communications:* This refers to important information that requires an action of employees, which may include HR-related updates like benefits selection, expense submissions, and event signups. Urgent communications cannot afford to be lost in communication channels like chat or video chat. This information should be pushed to employees within their workflows, so they do not miss it.

- *New communications:* This refers to new knowledge of which employees should be aware but on which they do not necessarily need to take any immediate action. This could include a new blog post going live, a new job opening, or a new teammate joining. New communications are important but do not require employees to drop everything to read them immediately. They can be consumed at the employees’ leisure.

- *Evergreen communications:* This refers to communications that are always relevant for employees to know but which are not necessarily new things like core values, mission, vision, and Wi-Fi passwords. There is no need to push employees to these resources or require action from them, but they need to be communicated and easily accessible, nonetheless.

With kids, dogs, roommates, time zones and more to account for, it is unreasonable to expect all employees to be free to consume information the minute it is sent. Employees need to be able to consume and easily revisit information on their own time—at the right time, in the right place, in the right format. That is where a knowledge-driven culture can help.

Driving better internal communications across an organization can increase agency, employee engagement, reduce fatigue and burnout, and instill a sense of cohesiveness and collectiveness in organizations. Specifically, top quartile performance outcomes for highly engaged organizations result in an 18% lower staff turnover in high-turnover organizations, 43% lower staff turnover in low-turnover organizations, and 13% increased organizational citizenship participation (Gallup, 2021).



## **Assessing Where an Organization Is**

While the four pillars of a knowledge-driven culture are critical to being truly knowledge-driven, it is important to recognize where organizations are on this journey and take proactive steps in effort to continually mature as a knowledge-driven organization.

For companies with no formal knowledge culture or process, there is often a lot of knowledge hoarding and silos that exist across teammates and teams. Whether the information lives in someone's head – or simply in a team-specific doc or tool, information is not shared and democratized.

When companies simply start creating and maintaining knowledge and commit to the ongoing accuracy of it, leadership can start to observe and recognize the impact of knowledge. Formal feedback loops are created, templates ensure consistency and predictability, and knowledge can evolve and keep pace with an organization.

Knowledge starts to become a strategic asset for the organization in the Continuous Improvement and Learning stage, or pillar two of a knowledge-driven culture. Knowledge Management directly supports key business outcomes backed by leadership, and a formal process is built around Directly Responsible Individuals (DRIs). Here is where the knowledge silos really start to dissipate, cross-company collaboration becomes standard, and measurement of the impact of knowledge evolves.

Lastly, organizations will be truly knowledge-driven when knowledge is baked into team goals and values, there are formal internal workflows to capture and share knowledge in a digestible and repeatable way, and there is a dedicated knowledge management employee or team. When organizations are knowledge-driven, work is optimized for the usage of information, rather than the storage or management alone. As such, critical information must be easily accessible in the tools teams use every day, and not become yet another context-switch away from an answer.

By cross-referencing an organization's activity and stage within the maturity model, areas of opportunity to continue to embed knowledge-sharing into the fiber of the organization can be identified.

## **FUTURE RESEARCH DIRECTIONS**

As hybrid work continues to emerge as a reality for most knowledge workers, the problems that have been spotlighted in a "return to normal" in fact pre-date the 2020 pandemic. With employees, some of whom were already on different schedules and different offices, are now even more distributed, understanding how knowledge management and culture can help enable teams will remain paramount. Exploring how the hybrid future might require more asynchronous work would be valuable as well. Specifically, further understanding into how a knowledge-driven culture can help employees and companies work more efficiently, more autonomously, and more flexibly, while driving employee engagement and collaboration is an exciting potential focus area.

## **CONCLUSION**

Francis Bacon believed that knowledge could be used to improve the human experience. Today, as knowledge workers work across the world—from offices and homes—collaborate, they must do so while fumbling across dozens of applications while inundated with messages and notifications. In some ways,

**How the Best Companies in the World and Their Employees Are Winning With Knowledge-Driven Cultures**

*Table 1. The knowledge-driven culture maturity model*

	No Formal Knowledge Process or Culture	Creation and Maintenance	Continuous Improvement and Learning	Knowledge-Driven Culture
<b>Culture</b>	<ul style="list-style-type: none"> <li>• Unclear ownership and lack of recognition of the broader impact of knowledge creation.</li> <li>• No self-motivation and defaulting direct questions to individuals.</li> <li>• Knowledge hoarding.</li> </ul>	<ul style="list-style-type: none"> <li>• Leadership can explicitly articulate the need for KM and the business consequences of not fulfilling it.</li> <li>• Commit to the ongoing accuracy of captured knowledge, understanding that most knowledge changes over time.</li> </ul>	<ul style="list-style-type: none"> <li>• Leadership supports company-wide programs.</li> <li>• KM program supports strategic business outcomes.</li> <li>• A work culture that places a value on learning to be better.</li> </ul>	<ul style="list-style-type: none"> <li>• Leaders actively contribute to sharing their knowledge.</li> <li>• Knowledge is explicitly stated in team goals and values.</li> <li>• Knowledge Program delivers clear value through increased productivity and cut costs.</li> </ul>
<b>People</b>	<ul style="list-style-type: none"> <li>• Knowledge sharing not incentivized or part of team and individual goals.</li> <li>• Knowledge is siloed, leading to team silos and inter-team animosity</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge is documented and sharing of information becomes prioritized in roles.</li> </ul>	<ul style="list-style-type: none"> <li>• DRI (directly responsible individual) defined.</li> <li>• Internal and external KPIs are positively impacted.</li> <li>• Collaboration becomes standardized across the organization.</li> </ul>	<ul style="list-style-type: none"> <li>• SMEs (subject matter experts) are acknowledged and incentivized to capture and verify knowledge.</li> <li>• High employee satisfaction.</li> <li>• Dedicated KM employee.</li> </ul>
<b>Process</b>	<ul style="list-style-type: none"> <li>• No formal processes for knowledge creation and distributions.</li> <li>• Knowledge is untracked for usage.</li> </ul>	<ul style="list-style-type: none"> <li>• Processes established for the capture and publishing of knowledge.</li> <li>• Feedback loops are created.</li> </ul>	<ul style="list-style-type: none"> <li>• Program is being designed for scale.</li> <li>• Governance standards defined.</li> <li>• Knowledge shared across teams and designed for different learning styles.</li> </ul>	<ul style="list-style-type: none"> <li>• Internal interactions and workflows are designed to capture information in a way that is searchable, digestible, and repeatable.</li> <li>• Teams work in partnerships.</li> </ul>
<b>Technology</b>	<ul style="list-style-type: none"> <li>• Knowledge lives in multiple locations and is not organized.</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge is created with consumption in mind.</li> <li>• Templates leveraged for consistency.</li> <li>• There is an informal commitment to maintenance.</li> </ul>	<ul style="list-style-type: none"> <li>• Analytics leveraged to inform knowledge strategy.</li> <li>• Knowledge available within multiple workflows.</li> </ul>	<ul style="list-style-type: none"> <li>• Single source of truth that integrates across platforms.</li> <li>• Designed to be accessible and actionable to those who need it, when they need it.</li> </ul>

employees have more information at their disposal than ever. However, as they drown in information, they thirst for knowledge.

Companies that do not figure out how to capture and harness knowledge in their organization risk losing customers, employees, and market share. When employees do not have easy access to trusted information they need to do their jobs, they lose faith in their company, their teams, and themselves. The impact trickles down not only to their coworkers but also to their customers.

Knowledge-driven culture can radically change an organization. Companies make better decisions if they have accurate information to make them with, employees feel confident and empowered to do their jobs when they have all the information they need, and more engaged employees lead to happier customers (Guru, n.d.).

Getting started does not need to be difficult. Here are a few quick tips that will help organizations get started building the knowledge-driven muscles in organizations.

- Establish a single source of truth for company information, ensuring employees can collaborate around, contribute to, and draw from the same pool of information.

## ***How the Best Companies in the World and Their Employees Are Winning With Knowledge-Driven Cultures***

- Reward the creation and maintenance of company knowledge. Knowledge is a team sport, with many contributors and consumers. By creating a sense of recognition around knowledge, organizations can increase the adoption and value of the knowledge base to begin with.

- Designate Directly Responsible Individuals to ensure accountability and the contribution of subject matter experts.

- Optimize company knowledge for those that need to read it, not those who write it. By establishing a knowledge-consumer first mentality, organizations can ensure knowledge is accessible and written in a way that can be leveraged in the moment. Doing so will help teams support one another – and their customers – more effectively.

- Build feedback loops to ensure when information can be improved and contributed to. In addition, feedback loops can also build a mechanism that turns a question that does not have an answer, captures this net-new knowledge as it is answered, and turns it into readily accessible information for other employees to use.

As companies continue to move into hybrid working environments, faced with constant change, inundated with chat noise and video fatigue, the importance of being knowledge-driven only stands to increase.

Knowledge might be power, but how will organizations choose to wield it?

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## **KEY TERMS AND DEFINITIONS**

**Asynchronous Communication:** Intermittent communication that does not require, nor expect an immediate response.

**Evergreen Communication:** Communications that are always relevant for employees to know but which are not necessarily new.

**Hybrid Work:** A flexible work arrangement in which some employees work at a central location or office, while others work remotely.

**Internal Communications:** The process of keeping internal employees informed, connected, and engaged.

**Knowledge Management:** The organization, capture, use, and analysis of the impact of a group's collective knowledge. In the business world, the definition of knowledge management also includes the maintenance of a knowledge base or portal where specific knowledge related to the company is housed.

**Knowledge-Driven Culture:** A culture as one that encodes the creation and maintenance of knowledge into its values and behaviors in a way that supports continuous improvement and learning, along with supportive notions of people, processes, and measurements.

**New Communication:** This refers to new knowledge of which employees should be aware but on which they do not necessarily need to take any immediate action.

**Remote Work:** A work arrangement in which employees do not meet in a central place to work.

**Urgent Communication:** Important information that requires an action of employees, which may include HR-related updates like benefits selection, expense submissions, and event signups.

## Chapter 5

# Knowledge Management in Emergent Amateur Organizational Cultures: Observations From Formula SAE Student Engineering Teams

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### **ABSTRACT**

*This chapter examines issues of knowledge management and cultural knowledge in the context of Formula SAE student engineering teams. Approximately 500 student teams field a small formula-style racecar in a series of annual competitions held globally. Despite being small, student-run teams with limited resources and high organizational turnover, strong teams have developed strategies to sustain knowledge creation and work to build the team's cultural knowledge over multiple annual design cycles. This chapter highlights three knowledge management challenges: organizational renewal due to graduation of senior members, capturing vital yet departing tacit and explicit knowledge, and engaging multi-year and collaborative projects. The chapter recommends that strong faculty and institutional support can help FSAE teams develop into stable knowing organizations with deep tacit, explicit, and cultural knowledge bases.*

### **INTRODUCTION**

This chapter looks at how organizational culture and cultural knowledge influence knowledge creation and decision making in a specific and somewhat unique domain – student engineering racing teams. These teams organize to design, manufacture, test, refine and field a fully-functional small formula-style autocross racecar in intercollegiate competition, conforming to the standards set by the Society for Automotive Engineers (SAE, 2021b). Such teams and their competition will be henceforth referred to as FSAE for short.

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Compared to larger, more diversified organizations, these student-led organizations are smaller and coping with limited human and financial resources. They are also consistently reinventing themselves due to high turnover due to student graduation. Because of their student membership, participants are also in the process of learning their professional craft as well as how to manage a complex, year-long systems engineering project. These factors lead to particular challenges that can frustrate the team's hopes for success in competition.

This unique contextual environment poses particular challenges to knowledge management and creating a sustained organizational culture. This chapter examines three particular issues teams face and shares observations from the field based on interviews and surveys conducted with student team members and faculty advisors. This chapter concludes that increased institutional support and more active faculty advisors can provide teams with a strong footing to develop cultural knowledge and give them a competitive advantage over schools with newer, more fragmented and more ad hoc organizational structures.

## **BACKGROUND**

Schein defines organizational culture as a pattern of shared basic assumptions that assists the group with adaptation and integration, and are perceived by the group to be worthy of dissemination to new members as the correct way to perceive the group's problems and challenges (Schein, 1992). Organizational culture is the milieu which defines how an organization perceives and addresses problems and affects the overall working climate and behavior of the organization (Saffold, 1988).

With respect to knowledge management, organizational culture defines the social context of what knowledge has value, how new knowledge should be created, validated and shared, and what tools and technologies are best suited to capture and disseminate knowledge created by the organization (De Long & Fahey, 2000). While knowledge management does investigate the use information technology as a facilitative tool to capture and disseminate explicit knowledge, knowledge management research has evolved to understand the overall information ecology of an organization (Nonaka & Konno, 2008). An organization's cultural knowledge helps define a collective identity, purpose and orientation of an organization and informs sensemaking, knowledge creation and decision making, the core information challenges of a knowing organization (Choo, 2006).

While organizational culture is not immutable, attempts to change information discovery, creation, and use without consideration of existing cultural practices risks creating significant crisis points which can derail even the most necessary of change goals (Hayes, 2018). A solid understanding of an organization's cultural knowledge and organizational culture helps shape knowledge management efforts that best fit existing practice and mitigates the consequences of poor fit.

Organizational culture is complex and can vary among and within specific organizations. Martin (1992) notes three perspectives of organizational culture – integration, differentiation and fragmentation. In an integrated organizational culture, there is a high degree of consensus, clarity and consistency, but at the potential expense of groupthink and rigidity. For example, an integrated organizational culture may find internal or external change threatening and respond by doubling down on core values rather than adapting to new circumstances. At the opposite pole, a fragmented organizational culture revels in complexity, with consensus, clarity and consistency being tenuous, fluid and tied to immediate and pressing concerns. While more adaptable to change, such organizations risk being too conflicted to en-

change coherently, and may find change sabotaged from within by subcultures holding discordant values or priorities.

Differentiated organizational cultures occupy a middle space where cultural consensus is not absolute and in which multiple subcultures can co-exist, but all within a broad agreement of shared norms and values that provide some guidance and direction. Larger organizations with multiple professional domains and administrative units each with their own subcultures are likely to be differentiated organizational cultures. Martin (1992) stresses that all three perspectives can co-exist in any given organization at any point in time, contingent on issues they are facing and the dynamics of power among key stakeholders.

Much research in knowledge management and organizational culture focuses on challenges faced by established organizations of considerable size and complexity (e.g., Choo, 2006; Hayes, 2018) while overlooking the particular challenges of small to medium sized organizations (McAdam & Reid, 2001). This chapter focuses on smaller organizations that are usually limited by resource constraints and working within an emergent and informal organizational culture (Durst & Edvarsson, 2012).

As with tacit and explicit knowledge creation and dissemination (Nonaka & Takeuchi, 1995), building and retaining cultural knowledge requires time and resources that smaller organizations may find lacking (Dostika & Patrick, 2013; Jarillo, 1989). Smaller organizations with limited resources may find that immediate priorities drain all available attention and energy, at the expense of strategic planning and investment in the organization's foundational knowledge (Bridge et al, 2003). As a result, time, budget and technological constraints may lead to fewer formal knowledge management channels and more reliance on informal information sharing among key stakeholders in the organization (Wong & Aspinwall, 2004).

With respect to Martin's framework of integrated, differentiated and fragmented organizational cultures (1992), it is often assumed that the more informal nature of smaller organizations coupled with the resource constraints noted above lead to fragmented cultures. This can be a strategic advantage, as smaller organizations with flatter hierarchies and more flexible processes can be more adaptable to change and be able to engage innovation unencumbered by bureaucratic procedure or organizational inertia (Cantu et al., 2009; Hudson et al, 2001; Wong & Aspinwall, 2004). However, in spending little time and energy on formal policy, procedure or strategic planning for knowledge capture and dissemination, it may be complicated for such organizations to sustain their efforts over time or to effectively leverage lessons learned from past work (Daft, 2007).

It should not be assumed however that all smaller organizations are necessarily fragmented. In smaller organizations, individuals have outsized impact on organizational culture by virtue of their larger relative influence. In some organizations, organizational culture and decision making is centered on a singular leader (Culkin & Smith, 2000). Leader-centric organizations can be highly integrated, benefitting from a high degree of consensus, clarity and consistency leading to decisions that can be made rapidly. However, should a particularly charismatic and influential leader leave, their absence may cause the organization to suddenly crash into fragmentation, with the potential for significant information loss as well. Similar situations can be found in family-owned organizations, where leadership is tied to kinship or other close interpersonal ties. Organizations whose leaders are tightly coupled due to kinship, faith, or relationship status may be cohesive but also risk being insular, risk averse, reluctant to change and prone to destabilization should emotional and interpersonal conflicts arise (Laforet, 2016; Vallejo, 2011).

In differentiated organizational cultures, countervailing checks and balances among subcultural groups can check individual power and influence, can give space and voice for other perspectives, and can strategically prepare for organizational renewal should any given leader move on. However, such organizations are also more complex, require more time to balance competing perspectives and interests,



and require significant human and financial resources to maintain. Small and medium sized organizations struggling to secure resources may find a fragmented or integrated organizational culture a more achievable goal.

## **KNOWLEDGE MANAGEMENT IN EMERGENT AMATEUR ORGANIZATIONS: OBSERVATIONS FROM FORMULA SAE TEAMS**

The focus of this chapter is the study of engineering student project teams, particularly those building small racecars entered in annual competitions sponsored by the Society for Automotive Engineers (SAE, 2021a) and related international professional associations. Over 500 collegiate teams design, manufacture, and build a formula-style racecar based on SAE rules (SAE, 2021b), and compete annually against other teams in approximately 12 regional competitions worldwide.

Formula SAE teams face a variety of challenges in developing a stable organizational culture and foundation of tacit, explicit and cultural knowledge. Teams range in size from 6 (the minimum required to field a car in all dynamic events) to approximately 30-40 students, with most majoring in mechanical and electrical engineering programs. While it is possible to complete the project with a small core team, the annual design lifecycle requires a considerable investment of time, money and effort. Larger teams are better suited to handle the myriad of tasks and deadlines required for successful competition, at the expense of being more complex to manage. Larger teams often organize into functional sub-teams around specific technical systems, and many also include non-engineering students to cover administrative, public relations and fundraising roles. In doing so, such teams are evolving from a group driven by a small group of core members into a more differentiated and complex organizational structure.

The largest competition, held annually in Michigan, USA in May, has been running for 40 years – a considerable amount of time for teams to develop a stable organizational history, culture and knowledge base. While the competition is still open to schools fielding a team for the first time, these teams often find themselves at a considerable disadvantage, requiring a few years of experience to ramp up to a competitive level.

FSAE teams share two constraints that make them unique as small emergent knowing organizations. While small and medium sized enterprises are often considered low-turnover environments (Durst & Edvardsson, 2012), FSAE teams differ in one critical aspect. Competition rules require all participants to be active students (SAE, 2021b), and students graduate and move on to new professional pursuits. Moreover, those leaving are often the most experienced team members, having risen through the organization to hold informal and formal leadership roles. In many respects this turnover resembles those faced by collegiate sports teams and requires the same attention to succession planning and new recruit training to maintain organizational cohesion. However, as a knowledge-based team, high turnover in the FSAE context also requires attention to tacit and explicit knowledge transfer (Nonaka & Takeuchi, 1995), as well as attention to maintaining the team's cultural knowledge and history. Without such attention, turnover can create rather seismic shifts in culture – a cohesive team can quickly become fragmented if culture is tightly coupled to core team leaders, all of whom graduate at the same time. As we will see in this chapter, teams employ a variety of strategies to address this issue, with varying levels of success.

A second challenge facing FSAE teams also stems from their student status. In differentiated organizational cultures, subcultures are formed around professional specializations which hold their own norms and values. Knorr Cetina (1999) notes that domain-specific epistemic cultures are powerful forces in

knowledge-based domains, structuring how individuals engage in sensemaking, knowledge creation and decision making based on professional training. In a larger organization, it is likely for a member of a highly specialized field to have more in common with similarly trained professionals at other organizations due to their common history and continued membership in a professional community of practice (Wenger, 1998). In student teams, epistemic cultures are, at best, under development. Indeed, SAE's involvement with this event is intended to acculturate young engineering students into professional practice. At the time of their participation, however, student team members are only learning what it means to think and act as an engineer.

The same can be said for team leadership and management. Larger FSAE teams require the coordination of subteams designing interconnected subsystems, all to hard deadlines and established rules and safety protocols, and within a larger institutional culture of the university which has its own standards of practice. Handling such a complex web of challenges becomes a systems engineering question, a domain of professional practice with its own history, culture, norms and procedures (INCOSE, 2021). For many student team leaders, this may be the first time they have managed such a complex system, and it is quite feasible some might make decisions that more seasoned professionals would likely avoid.

The amateur and emergent nature of Formula SAE teams leads to fluid organizational cultures and requires a variety of approaches to handle organizational tacit, explicit and cultural knowledge. This chapter will focus on observations from 43 surveys and onsite interviews conducted by the author in the main American competitions in 2014-15 (Jones, 2017), with supplemental observations from later competition visits and contact with participants.

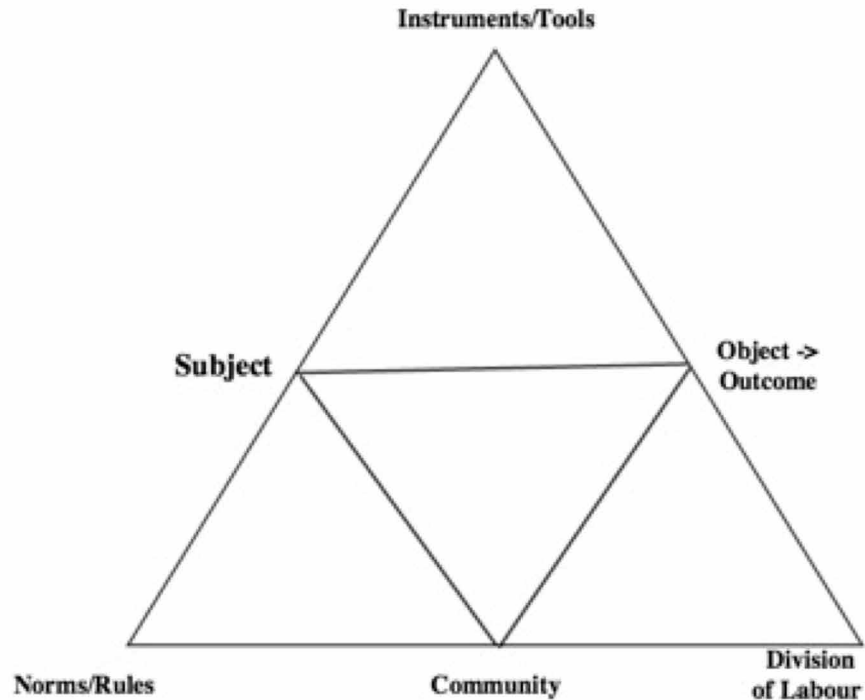
## **CONSIDERING CONTRADICTIONS: A CULTURAL HISTORICAL ACTIVITY THEORY APPROACH**

Research questions were informed by cultural-historical activity theory (CHAT) (Engestrom, 1999; Engestrom, 2008; Leont'ev, 1978). The central focus of CHAT is a core activity where human subjects use various tools and technologies to create objects that ideally meet their intended outcome (Vygotsky, 1978). CHAT extends Vygotsky's constructivist dialectical model of activity to include broader socio-cultural influences such as unwritten norms and formal rules, a community of external stakeholders, and divisions of labor and power. CHAT descriptions of human activity are commonly represented as a diagram shown below in Figure 1 and has been widely used in a variety of information science research domains (Allen et al., 2011).

Of particular interest here is the notion of contradiction (Engestrom, 2008; Meyers, 2007). In attempting to realize any given outcome, there can arise points of conflict within and among nodes in the diagram above. Negotiating contradictions and competing priorities can be essential in collectively achieving the intended outcome, and conversely, failure to attend to specific contradictions can be detrimental to the overall outcome.

There are four types of contradiction noted in CHAT (Engestrom, 2008). Primary contradictions focus on conflicts within any given node (e.g., in a group setting, two subjects may approach the activity differently, and have to reconcile their differences to collaborate), whereas secondary contradictions investigate conflicts between various node connections (e.g., a subject may choose three different research methods to investigate a given problem, yielding three related but distinct results that then have to be reconciled).

*Figure 1. A generalized cultural historical activity theory (CHAT) diagram (adapted from Engestrom, 1999)*



There are also contradictions that occur between various activities. Tertiary contradictions occur when a given activity changes over time (e.g., an initial plan for an activity may have to change as an organization gains or loses resources or contends with changes in external rules and regulations). Quaternary contradictions occur when one activity model shares an intended outcome with another activity model (e.g., if two groups seek the same outcome, it may not be possible for both to be successful, setting up potential for conflict).

The concept of contradiction is powerful in framing human activity because it does not presuppose any ideal or correct answer. There are often multiple potential paths through the activity model, and while some may prove more fruitful than others, the CHAT model allows for a range of interpretations and responses to the contradictions that arise.

For the purposes of this chapter, we will examine three particular contradictions – organizational turnover (a tertiary contradiction between a team’s current and future roster), capturing and retaining organizational knowledge (mostly involving secondary contradictions between subjects and various information systems), and complex multi-year and collaborative design lifecycles (for multi-year projects, a tertiary contradiction in extending the normal design cycle over time; for collaborative projects, negotiating quaternary contradictions as competing teams collaborate to meet the same goal). Unless otherwise noted, quotations below are derived from and represented by respondent number, a full table of which can be accessed in (Jones, 2017).

## **Organizational Regeneration in a High Turnover Context**

Given that FSAE teams are made up of student team members and leaders, it is predictable that a number of students will depart the team annually due to graduation. It is common for teams to report annual attrition rates of 50% or more. Such attrition can be particularly stark at the level of student team leadership, most of whom are senior students. While teams are well advised to attend to this inevitable tertiary contradiction, it is surprising how many treat this as an afterthought. When asked about how their team plans for organizational regeneration, one faculty advisor honestly noted “it just happens” (#40).

Such an attitude leaves quite a lot to chance and does not seem to be successful – through analysis of competition results (SAE, 2021c) #40’s team routinely finishes in the lower half of the competitive field of 120 in Michigan, and has never finished in the top 25 despite being a regular annual participant. While their team’s culture might be satisfied with such mediocre results, other teams may prefer a stronger return on what is a significant investment of time and effort.

Other teams are more deliberate about team recruitment and regeneration. Respondent #29 noted that their team identified specific roles that would be left vacant due to graduation and worked to recruit specific people to fill those roles. Respondent #38 took formal recruiting a step further, noting a points system based on performance goals that helped determine final team rosters in any given year.

Six respondents noted that they recruited team members just before the competition to give new team members a view of the final intended objective of the team. Those members may not have a large seniority advantage over those recruited in the new academic year, but the experience and context they gain from witnessing the competitive environment can be both elucidating and invigorating and provide context for their actions.

Structured recruiting is not the only approach used by FSAE teams. A similar number of teams preferred a more organic approach to team recruitment. Respondent #24 noted:

*We allow them to make the call – if they’re interested in doing things, we’ll see more of them. If they just signed up for a club because they thought it was cool, we’ll see less and less of them as they realize real work is expected. By the end of the year, we know who’s on and who’s not. (#24)*

Such an emergent model was also common in determining team leadership – instead of ascribing roles and titles in advance, respondent #4 noted “we acknowledge individuals that put in more effort. They in turn get consulted more and become obvious unspoken leaders.” In such a model, new team members rise through the ranks through dedication to the team’s overall mission. Such a model may, however, recreate a homogeneous team culture where only those who “fit” the dominant organizational culture are appreciated, potentially marginalizing students and skill sets that could be valuable in diversifying the organization.

With respect to development of new recruits, 10 teams noted the importance of mentoring, at various levels of formalized implementation. Mentorship and apprenticeship leverages the socialization aspect of Nonaka and Takeuchi’s socialization, externalization, combination and internalization (SECI) model of knowledge creation (1995) by creating semi-structured opportunities for students to learn from their peers through social contact. Respondent #7 notes:

*A lot of my time this year will be sitting with the new recruits to quickly bring them up to speed with the team and general suspension design. I have also given all the new members senior mentors. Hopefully*

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*this will allow for a better knowledge transfer to the freshmen. We are also looking at ways where the new members can sit, watch and ask questions while the senior members design parts, so they can see more complicated design process. My hope from this is that this will show the new members how to make good design decisions, and get a general idea of how more complicated parts are designed. Technical knowledge can always be learned, but this design mentality can only be gained from experience. (#7)*

Such an approach renews membership in important sub-systems that are essential to a successful car. Structuring early exposure to subteams allows senior members to mentor new members in the context of practice of their activity, thus sharing tacit knowledge gained on the job. This can be seen as an example of Lave and Wegner's (1991) notion of legitimate peripheral participation, in which peripheral activity can be seen as a valuable learning channel for less skilled members.

As with most CHAT contradictions, there is no one "right" path for recruiting and developing team members, and processes usually derive from their fit with the overall organizational culture. A more structured recruitment strategy may better fit teams with a more developed, complex and differentiated organizational culture, whereas teams operating in a more fragmented and emergent organizational culture may opt for lower-overhead solutions at the risk of having significant skills and organizational knowledge depart with little to no strategic plan for regenerating an effective team in future years.

### **Capturing and Retaining Organizational Knowledge**

While sharing tacit information through mentorship is effective, it is also important for teams to be able to record past developments to learn from their successes and mistakes. Creating and maintaining a permanent record of knowledge allows teams to move up the SECI knowledge creation model from socialization to externalization and combination (Nonaka & Takeuchi, 1995) and can provide a rich archive of internal information to inform future decision making.

Not surprisingly, team reports, image collections and data from internal testing were commonly cited by team members as resources that inform design decisions. However, many teams noted difficulties in using their internal information repository. Respondent #17 noted the following about their team's image collection:

*We have a collection of images on our server from competition photos – but they're a bit all over the place. A photo might not say much – a photo of a brake system doesn't tell you which brake system it might be, and no one seems to write down notes about that, especially competition photos. It's easy to forget whose car was photographed – we try to tell our photo teams to take photos in an order with the car # and inspection stickers so we can at least trace them to specific cars/years, but that's only followed sometimes. (#17)*

Similarly, respondent #29 noted that internal team reports were of questionable accuracy and quality, and that it was often easier to track down the original author to ask questions. Another noted internal testing data as "...garbage – half the data was missing, the rest of it was just crap. I hope I can do a better job this year, definitely going to be a summer project." (#14)

This speaks to an essential functional role often acknowledged but not always supported by team organizational culture. Creating quality data is not automatic. Folders filled with untagged digital photographs or poorly formatted data from testing quickly become detached from context, making their

relevance for future knowledge creation and decision making questionable. Especially since student engineers may have limited experience with technical writing, documentation or archive management, leaving students to their own devices without training or support may create a range of information artifacts of questionable future value. Without team members committed to the curation and management of the team's information archive, a virtual shoebox of disparate and unlabeled data sources may prove to be a source of confusion and information overload, making its use more complicated in future decision making.

Also worthy of note from #14's comment is the issue of time. Poor information repositories are often the consequence of inadequate time to faithfully document events. Especially in more fragmented organizational cultures, during the design lifecycle team members are frequently bouncing from task to task, many of which are of immediate and critical importance. Documentation is considered as something that can be done later, a time that conveniently never arrives. This is especially the case with data collected at competition, which can be a chaotic and exhausting time. Without time reserved for combination and internalization, information loss is very likely and that can directly impact the quality of the team's information repository especially as the original authors graduate and move on to other pursuits.

All that noted, there are also success stories. Respondent #3 noted that their team ran a cloud-based information repository that allowed team members to contribute annotations about past team reports and data, both in their lab facilities and on-site at competition. Intriguingly, this information repository also served as a connection point with team alumni, who had continued access after graduation and often contributed observations. Unlike other organizations where departing team members may be reluctant or contractually unable to share their expertise, recent graduates are more willing to be of assistance to the generations of team members that replace them. Indeed, seventeen respondents noted alumni connections as a source of information in their research and development work – and a team information repository that has regular presence and participation from recent alumni can be a dynamic and valuable team asset.

While there are significant challenges in creating an effective and robust information record of team data in an amateur and high turnover context, the benefits are also clear. Arguably the gold standard in recent years is Global Formula Racing (GFR) – a complex, differentiated international team run jointly by Oregon State and DHBW Ravensburg in Germany (GFR, 2021). Team members design subsystems collaboratively from both locations, building separate cars on two continents from a collective information database. While the author's initial interview with the team's faculty advisor was cut short due to the team's scramble to resolve a technical issue causing them to fail the required competition noise test, it was clear from observation the GFR team was adept at integrating just-in-time access to information, with team members carrying tablets to access their repository in real time, with the faculty advisor monitoring progress and ensuring that important information about the noise issue was added to the organizational record for future analysis.

Such dedication to recording and managing data would be moot if it did not yield results – however, GFR has become a dynastic team in both American and European competition venues, winning the Michigan competition 5 times in the 2010s and finishing outside of the top 5 only twice due to technical failure in the main endurance race (SAE, 2021c). This record of success has attracted the attention of competing teams, with five respondents specifically noting they were striving to imitate GFR's comprehensive information systems foundation. However, many also noted technical, financial and human resource challenges in doing so. Respondent #21 noted some challenges faced being an international team attempting to operate on American soil.

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*We're a lot more tied to the cloud than we realized – it's been frustrating to not have 24/7 access to data. One team member took it all offline yesterday at the hotel so we at least have everything on a laptop in the truck, but that's not easily retrieved everywhere. And while a few of us bought a data plan before getting here we're already over - a few of us are going have a shock on our bills when we get back. (#21)*

While an information repository requires access to computing and wireless networks, arguably more important is an organizational culture that supports and privileges its continual use in information seeking, knowledge creation and decision making. As teams mature and develop consistent organizational structures and cultures, they are more able to emulate the impressive infrastructure put in place by top-tier teams like GFR. Newer teams are likely to find such a project a considerable challenge to take on, as are teams that cannot secure the human, financial and technical resources required to develop and refine such information systems.

### **Supporting Multi-Year and Collaborative Projects**

Information repositories can assist with another common challenge faced by FSAE teams. The design cycle of an FSAE car is rapid, moving from initial design to final testing and validation at competition in one academic year. While systems can undergo iterative improvement over time, more profound changes (e.g., changing from space-frame chassis design to integrated composite tubs, or integrating full aerodynamic packages) may not be feasible in this compressed design cycle.

To successfully manage multi-year projects, student leadership must juggle the demands of a longer than usual research and development phase, potential conflicts with other critical subsystems of the car, high turnover on team rosters, potential annual changes in competition rules, and the often tough decisions of telling some team members that their efforts will not make a given year's car because the system is not yet fully developed. This creates a number of potential tertiary contradictions as the activity evolves of time and circumstances. Building a robust information repository of past design and test data as well as access to the tacit knowledge of past members becomes even more important in managing long-term complex systems change.

Given these challenges, it was not surprising that seven respondents suggested their team avoids the problem altogether by only focusing on projects that can be completed within a given year. While easier, this may mean certain innovations are off-limits or that systems may be rushed to meet immediate deadlines, a strategy which may increase odds of systems failure during the critical endurance race. Three respondents simply said they just work extra hard – but such a solution only works if there's extra time and energy to spare. Such an approach is likely to be more common in teams with a fragmented organizational culture coping with the crises of the day and unable to scale up to challenges that do not match their timeframe.

A differentiated organizational culture with a strong knowledge base is more likely to be able to adapt to the significant logistical challenges of multi-year projects. Respondent #4 noted a more sophisticated multi-year process.

*What approximately 15 1-3rd year members will do is work on multi-year development projects. This allows for implementation of larger changes to take place in more realistic time frames. The individuals assigned to these areas will become extremely familiar with the new systems they are designing, and then transition roles to implementation when their design is being implemented on the car. (#4)*

By starting newer younger team members out during early stages of design, they are able to follow the design cycle throughout their tenure and still gain the satisfaction of seeing their work fully implemented. One potential drawback of this strategy, however, is that younger team members may not be sufficiently knowledgeable to lead a complex design effort. Early curriculum in engineering programs covers foundational concepts, with specialized domains only covered in later years of the program. Leaving sophisticated design projects to the inexperienced may lead to the creation and implementation of partial, incomplete or wrong mental models, a common problem in weakly scaffolded project-based learning (Mandin et al., 1997). An apprenticeship model lead by more accomplished students might be a more fruitful approach than assigning new team members complex design projects without scaffolding and pre-requisite knowledge.

A more drastic solution can be skipping a competitive year and fielding a car that has been in design and development for two or more years. Sometimes this happens by necessity when a team's annual design cycle leads to an underdeveloped car that the team agrees is not ready for competition. Planning ahead for a gap year may be less disappointing and a better strategy for the organization as a whole. Indeed, new teams often prepare for two or more years, visiting competition as observers and engaging in discussion with more established teams before committing to their first design cycle.

Such a strategy works because of a rather peculiar cultural convention of this competitive context. Competition rules structure a zero-sum game – points in all events are gained in ratio to other teams' results (SAE, 2021b). It would be fair to think such a point structure would generate a quaternary contradiction and that hoarding of information and suspicion towards competing teams would be the norm.

However, while the rules of the competition may discourage sharing, the norms of the overall circuit are cooperative with many instances of information sharing among teams evident. Respondent #10 sums it up thusly:

*During competition, we've helped out teams by lending them or giving them tools or materials. It's in the spirit of the competition to help each other out, that's part of the beauty of FSAE. We helped [X] University modify their silencer which allowed them to pass sound tech. We've given several teams our endurance event data and given or traded other items with dozens of other teams. (#10)*

This is not an isolated case – 17 teams in the sample shared examples of direct assistance to other teams at competition or sharing data and design with teams are in direct competition for the same end goal. Assistance to new teams or those considering joining the circuit is particularly common and makes sense given the emergent teams are unlikely to be direct threats, at least in the short term. Established teams are often happy to assist newer teams get up to speed.

That noted, there is a certain etiquette to information sharing. Respondent #23 noted significant frustration with one new team who swarmed their competition paddock taking detailed photographs of their car, noting:

*What's weird is that if they just asked us questions, we'd probably give them better information. Not sure what a bunch of photos without the background design work will get you. One team I swear might come up with a close copy of our car next year. They won't know why, and it probably will never work, but it just might look exactly the same. (#23)*



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Beyond ad hoc assistance, teams also occasionally collaborate in more formal arrangements. The aforementioned GFR team and University of Stuttgart (Pistorius, 2014) have both created structured collaborative efforts that increase their overall capacity. These collaborative efforts have paid off – GFR and Stuttgart have become the dominant teams at the Michigan competition, having won all competitions in the 2010s (SAE, 2021c). Respondent #1 noted their already quite successful team was considering a “sister school” arrangement with a similarly competitive team to emulate the track record of these teams. It remains to be seen if other schools develop similar joint ventures.

As small organizations with limited technical and financial resources, it also may make sense for teams to collaborate on particular technical challenges. A long-standing example of this would be the Tire Testing Consortium, a collaborative research effort funded by small contributions from over 650 emergent and established teams worldwide (MRA, 2021). Tires are the foundation of any suspension design model, but tire data from manufacturers is sparse due to limited production runs of small car tires and industry secrecy. While teams can conduct their own tire data acquisition, this requires specialized equipment most schools do not possess and a significant budget, as it requires wearing tires down to failure. The consortium was created by teams in collaboration with a major suspension design judge to fill this gap – the cooperative hires a professional testing facility that generates tire test results shared by all member teams, allowing member teams to make better data-driven decisions on suspension design. Such co-optition (Gnyawali & Park, 2009) enables small organizations to gain access to valuable resources that they alone would not be able to acquire, and is one of many examples of cooperation and collaboration evident in the FSAE competitive context.

## **SOLUTIONS AND RECOMMENDATIONS**

FSAE student teams face a myriad of challenges as they negotiate the contradictions of their chosen activity. However, they do not do so in a vacuum – they exist as part of a larger educational institution that can provide significant space, technical and financial resources. While teams with a strong foundation of support from their schools are not automatically successful, they are likely to face fewer challenges than less resourced teams who are forced to spend more of their limited time securing basic resources or battling against a contrarian administration. Attaining such support, however, is not guaranteed.

A potentially important role in negotiating this contradiction is that of faculty advisor. Without support from senior leaders, knowledge management efforts are often ineffectual (Davenport et al, 1998). In this particular context, however, student leadership is temporary and fluid due to graduation, and may find themselves overwhelmed with the immediate task at hand. A committed faculty advisor can help by developing the team’s longer-term organizational priorities irrespective of generational shifts in leadership, which can include sustaining the team’s tacit, explicit and cultural knowledge and mentoring student team leaders to prioritize knowledge creation and retention. In doing so, an engaged faculty advisor can act as a de facto chief knowledge officer (Liebowitz, 1999), playing a role that student leaders may struggle to fulfill.

While all teams nominally have a faculty advisor, their level of involvement varies considerably. Indeed, many are not present at the competition even though rules strongly suggest they must be (SAE, 2021b). Respondent #28 even struggled to name their advisor, noting that they played more an administrative role but otherwise let the team “do its thing.” Their results over years of competition suggest that such a

laissez-faire approach was not particularly helpful. Indeed, seven teams noted some frustration with the level of engagement with their current advisors, wishing for more support and mentorship.

Less common but equally problematic are faculty advisors who play too active of a role. Respondent #22 suspected that a competing team had a faculty advisor who did all the design work, relegating team members to more semi-skilled roles. This allegation was later substantiated by informal discussion with a competition judge and bears out in competition results. The alleged team's performance in the design event, where students must answer questions directly and advisor participation is explicitly banned, has significantly trailed their overall results. When forced to defend their design, team leaders and members did not have a solid command of their own work and that judges were quite aware of the disconnect.

Advisors that seek a more balanced and measured role do exist and are generally more appreciated. Respondent #2 noted their advisor plays a largely hands-off role, but is critical in acting as a surrogate for design review judges, asking tough questions in advance and preparing sub-team leaders well for extensive questioning of their work. This insight was not surprising as Respondent #2's team is routinely strong in the design review component of the competition.

Respondent #3 said their advisor allows team leaders to forge their own direction, interfering only when decisions may run afoul of university policy. He also noted their faculty advisor was himself a former FSAE team leader, and served as an excellent mentor for both engineering, leadership and general life skill development as a result. Similarly, respondent #38, a faculty advisor, noted their approach as simply "I would only intervene if safety or budget were at risk. They are empowered to fail."

Achieving the optimal balance between micromanagement and absentee status is a difficult balancing act. Golding (2009) notes a continuum of constructivist learning between unstructured and teacher-driven approaches, privileging a middle ground community of inquiry model where faculty allow for significant student direction and leadership but within a framework of disciplined dialogue, mentorship and critique. Golding also notes that faculty habituated to a more authoritative role might struggle with this ideal state - however, within the research record at hand here, it was clear respondents suffered more from a lack of engagement than over-engagement.

Given the many professional responsibilities of faculty members, it is understandable how many might prefer a more limited role. Being an effective facilitator of project-based learning is time consuming and often not well supported (Rosenfeld & Rosenfeld, 2006). However, in a high-turnover environment, faculty advisors can play a critical role in bridging multiple generations of team rosters and reflecting the team's overall history and culture. An advisor who strikes the right balance between "empowering to fail" and necessary intervention allows student team members and leaders to engage complex knowledge generation activities while protecting the team from situations that cause them to run afoul of larger institutional concerns.

Faculty advisors can also be effective bridges to the larger institution and help secure the technology, space, budget and technical assistance required to better facilitate the activity of their team. Respondent #37, a faculty advisor, noted:

*For space, the team has space within what is called the [X], a 24,000 ft<sup>2</sup> space dedicated to the support of our student engineering competition teams. Each team within this space (there are currently 7 hosted) has office space, dedicated build and storage space, and access to the common machine tools. X is open 24/7. It has machine tooling available 24/7, up through 3-axis CNC mill. The school staffs a 1/2 time machinist/staff support person dedicated to the infrastructure support of the X and its teams. (#37)*

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This is arguably a gold standard – most teams do not claim access to such a large custom-built facility available 24/7 and monitored by technical staff, and not surprisingly, #37's team is a perennial top-tier contender in the Michigan competition. However, such facilities do require negotiating for a large share of a school's budget, which is a task that might be daunting for student team leaders. A strong faculty advisor can play a valuable role in negotiating for such support with key institutional stakeholders.

There are reasons why schools will provide such support. FSAE teams often play key roles in recruiting new students to the school, securing alumni fundraising, and meeting the work-integrated learning and soft skill training requirements of accreditation agencies (e.g., ABET, 2021). Teams are well advised to maintain mutually beneficial relationships with their administration and try their best to negotiate conflicts with a bureaucracy that is often at odds with their emergent, amateur and at times risky organizational culture. A strong faculty advisor can be a good guide, mentoring team leaders on how to best navigate complex institutional procedures and smoothing over inevitable tensions.

However, resource issues are a common concern, especially when compared to other collegiate competitive domains. Respondent #4 notes:

*It is in our opinion that the design teams are like the engineering varsity sports teams, though the actual varsity sports teams are catered to significantly more... I spoke with teams from Germany as an example, where they do not have a varsity football team, so they have everyone join and get excited about their team. (#4)*

While FSAE teams are similar to collegiate varsity sports teams in structure, collegiate sports teams are often considerably better supported with special-purpose facilities and dedicated coaching, especially in the American context where varsity sports acts as a de facto minor league for professional sports and are a considerable revenue generator for the university. While in the short term it is unlikely that schools would support competitive engineering project-based learning teams to the extent they support their basketball or football programs, schools that recognize the value of their project-based learning teams and support them in the form of faculty advisors and infrastructural resources are providing their teams with a context more conducive to success. However, achieving this requires both significant commitments from the school, faculty and staff as well as stronger integration of team culture and practice into overall school priorities.

## **FUTURE RESEARCH DIRECTIONS**

The dynamic nature of FSAE as a competitive environment assures that this chapter and the larger work that serves as its foundation are partial and subject to change. Two considerable changes are impacting the FSAE competitive environment at present. As gasoline-powered internal combustion engines are arguably reaching the end of their lifecycle, many teams are switching over to electric drive, which is a considerable systems engineering challenge and requires a teams with significantly different skill sets. This switch is unlikely to be done in a single annual design cycle. Investigating how established teams are handling (or avoiding) this change would be an excellent opportunity for future research. It is feasible to suggest newer teams with more fragmented cultures and less of a vested knowledge base could leapfrog more established teams with substantial – but increasingly obsolete – knowledge.

The second change is one we all have had to contend with – the global COVID-19 pandemic. Both the 2020 and 2021 North American competitions were forced into virtual space to comply with local health and safety requirements, and by most accounts this replacement is not a compelling alternative. While some courses and research projects can adapt to virtual delivery reasonably well, FSAE is by design and history an experiential activity. Participants are literally getting their hands dirty in creating a fully operational racecar, and the majority of competition points are tied to dynamic events that test an actual car's on-road performance. This cannot be simulated without drastically altering the nature of the core activity. Sadly, two years of suspended competition have robbed contemporary student team members of a richer professional development and educational experience.

How the series bounces back after COVID-19 restrictions are lifted would be an interesting question for future research. It can be assumed that teams with a strong organizational culture and internal knowledge base can reset to their 2019 effort with relative ease. It is also likely that teams with a culture oriented to strategic planning may take advantage of this hiatus by committing to complex, longer-term projects while free from the many immediate pressures of fielding a competition car. Conversely, teams with a more fragmented organizational culture may struggle to maintain cohesion without an immediate project at play, and if significant changes in enrollment influences overall school budgets, other teams might find themselves particularly starved for resources.

While this research is focused on teams in the Formula SAE series, observations from this series would extend well to similar project-based learning opportunities, including others supported by the SAE (SAE, 2021a) as well as similar competitive domains in other academic disciplines. This research is also instructive in the use of CHAT as a way of framing complex organizational development challenges beyond the domain of ad-hoc teams and capstone design courses which are the primary focus of much project-based learning research. Beyond the educational domain, this research may also transfer well to other smaller teams with high organizational turnover, such as retail or hospitality teams or entrepreneurial startups operating on limited resources and weaker cultural knowledge foundations.

## **CONCLUSION**

Formula SAE teams are small emergent knowing organizations engaged in an intense design cycle shaped by significant information seeking, knowledge creation and decision making challenges. These challenges are more complex when one takes into consideration high organizational turnover due to graduation and the amateur status of students as both engineers and leaders of the organization. Building a strong differentiated organizational culture with heterogeneous and complementary roles and a strong commitment to knowledge management helps established teams learn from past efforts and develop plans for future R&D, including more complex design challenges that might require sustained effort or collaboration with other partners. While student team members and leaders handle these challenges well, teams that operate within a supportive institutional environment and under the guidance of effective faculty advisors face fewer challenges in their quest to design, manufacture, test and field a quality competition-ready car.

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## KEY TERMS AND DEFINITIONS

**Community:** An extension of the core activity in CHAT, community refers to external stakeholders who are not subjects of an activity but nevertheless have a say in its realization.

**Division of Labor:** An extension of the core activity in CHAT, division of labor represents relations of power and authority that may enable or constrain the execution of a given activity.

**Norms/Rules:** An extension of the core activity in CHAT, norms/rules represent both formal laws and informal customs at play as subjects consider their activity.

**Object/Outcome:** Part of the core activity in CHAT, the object is the end result from subjects engaging tools/technologies to complete an activity; the outcome is the intended object, which may differ.

**Primary Contradiction:** Conflicts that may arise within one node of the CHAT model (e.g., inconsistencies among formal rules and unwritten norms/values that may require reconciliation).

**Quaternary Contradiction:** Conflicts that arise when one activity model clashes with another that share similar intended outcomes (e.g., two groups independently working towards a goal that only one group can attain).

**Secondary Contradiction:** Conflicts that may arise between various nodes of the CHAT model (e.g., a subject's intended activity raising concern of community members).

**Subject:** Part of the core activity in CHAT, the subject is an individual or group attempting to achieve a given activity.


**Tertiary Contradiction:** Conflicts that unfold as a CHAT modeled activity changes over time (e.g., changes in subjects, rules, tools/technologies over time may force a change in the overall execution of the activity).

**Tools/Technologies:** Part of the core activity in CHAT, tools/technologies are methods engaged by subjects to realize their activity.

# Chapter 6

## Impact of Adhocracy Organizational Culture on Effective Knowledge Management

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### **ABSTRACT**

*All companies in today's world are in intense competition. In order to survive the competition and always be one step ahead, all industries are required to give considerable importance to creating adhocracy culture within the firm, according to which employees must be provided with freedom and support. The employees should be encouraged to share their ideas and point of views with others and to take risks because today's most valuable asset is knowledge. This can ultimately help in enhancing creativity and innovation within the firm. The use of supportive culture is helpful for ensuring effective knowledge management practices within the firm. The focus of this research study was on investigating the importance of adhocracy organizational culture in terms of ensuring effective knowledge management. Based on findings of this study, it was found that there is a significant positive impact of adhocracy organizational culture on effective knowledge management.*

### **INTRODUCTION**

Based on a knowledge-based view, organizations are involved in creating, transferring and protecting knowledge effectively as compared to markets, which must justify their boundaries and existence. Strategic view requires organizations to differentiate their performance due to the heterogeneity of knowledge bases. Hence, knowledge is a key strategic resource of companies (Ayatollahi & Zeraatkar, 2020). Some knowledge is scarce and such assets and complex knowledge that cannot be imitated or replicated by other firms are not easier to transfer. So, it is essential to effectively manage these organizational

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processes, enabling certain types of knowledge to become the source of competitive edge for the firm (Kokt & Makumbe, 2020). One of the most important elements that influence a firm's capacity for managing knowledge is organizational culture. The organizational culture is an idiosyncratic asset that accumulates with the passage of time and can serve as a source of competitive edge. It is a significant factor of success in the process of knowledge management and plays a key role in the establishment of the strategic framework of an organization (Ashok et al., 2021). Besides, organizational culture also has an impact on some other elements of the firm, like human resource management and management style. The promotion of organizational culture can help facilitate the implementation of knowledge management, making a significant contribution to establishing a shared vision and commitment to the firm, with respect to common projects, autonomy in decision-making, and teamwork (Oh & Han, 2020). When the culture of an organization is built up amongst other elements, like the values, work systems, and beliefs of the firm, it can then either encourage or hinder the effectiveness of knowledge management practices relevant to developing, transferring, or implementing knowledge. Therefore, change encouraged through knowledge management gets influenced through the existence of cultural norms, which can make a significant contribution to the process of change management (Frinses et al., 2021).

In the current competitive and dynamic business world, knowledge has become a significant asset in almost all types of organizations. Effective knowledge management gives the capacity for engineering the formal and informal structures, key business functions, and processes of an organization. Effective knowledge management is considered to be highly important for formalizing and leveraging intellectual assets (Piwowar-Sulej, 2021). There is an increasing demand for effective implementation of knowledge management systems, with a purpose of transcending boundaries to disseminate significant knowledge throughout projects, firms, and teams. However, to ensure the effectiveness and success of knowledge management, there is a need to integrate human elements and the right culture (Ayatollahi & Zeraatkar, 2020). Due to the rapid change in competitive environments and increased intensity, it has become crucial to focus on appropriate knowledge management in the construction industry. The construction industry of Turkey is labor-intensive and depends highly on experience and practice. So, there is an inclusion of a lot of knowledge within the construction industry. Moreover, a vast pool of knowledge has been created due to the dynamic business environment and the use of latest technologies. Hence, effective knowledge management is highly important for exchanging and reusing knowledge in both the short and long term (Nguyen, 2019). In the construction industry, each project carries a lot of knowledge, which needs to be captured properly for appropriate use in the next project. This often includes key skills, technical abilities, and competencies gained while completing a previous project. It is important to capture such skills, technical abilities, and competencies to properly make use of them in the next project. In construction projects, different teams work for different projects and each member carries different types of skills. Also, the turnover rate is high, because most people work based on projects. Due to such high turnover rates, construction firms lose expertise and skills and this ultimately affects their upcoming projects. Hence, effective knowledge management plays a key role in ensuring the success of construction projects so that knowledge can be properly created, stored, and retrieved (Frinses et al., 2021).

The construction industry is basically a project-based industry. Individuals from various departments or organizations gather in the form of a team to complete a project. Knowledge is basically created during a team project; however, in the absence of an effective organizational culture, this knowledge can be lost. It is not possible to reuse knowledge when there is no appropriate channel or culture for transferring it. Effective knowledge management is highly important for ensuring long-term success of an organization. When the managers in construction companies do not give importance to effective

knowledge management, this can result in failure to keep up with latest technology. Due to lack of effective knowledge management practices, employees cannot get updated information, sometimes leading to demotivation. Sharing knowledge across projects is equal importance and can only be possible through an appropriate organizational culture. The extent to which a company can create organizational values relies on its capability of creating, transferring, and using knowledge, resulting in enhanced organizational competition. When companies do not give enough importance to effective knowledge management, they cannot create or transfer knowledge successfully. Due to lack of effective knowledge management practices, companies remain far behind their competitors and do not gain a competitive edge. Hence, it is highly important for organizations to give considerable importance to the factors that ensure effective knowledge management within an organization. Organizational culture is one of the key aspects linked with effective knowledge management (Oh & Han, 2020). It is always important to use and display knowledge in an appropriate manner. It is not enough to create and validate knowledge in an organization; its presentation in the right form is also important for success. The right display of knowledge at the right locations is key for ensuring its effectiveness and utilization in an appropriate way. Organizational culture is referred to as a major contributor to knowledge management because it depicts a key source of competitive edge for firms for the purpose of achieving goals. There is a need for this type of organizational culture within a firm, based on which individuals are encouraged to collaborate and share knowledge (Siakas et al., 2020). A number of studies (Adeinat & Abdulfatah, 2019; Oh & Han, 2020; Kazemi et al., 2020) have been conducted to investigate the importance of organizational culture to ensure effective knowledge management. However, none of the previous studies have mainly focused on investigating the direct impact of adhocracy on effective knowledge management, especially in the context of the Turkish construction industry. Hence, this research study aims to fill this gap with a key focus on analyzing the relationship between adhocracy and effective knowledge management in the context of the Turkish construction industry.

## **Research Objectives**

- To understand the importance of knowledge management in an organization.
- To identify the key steps involved in the process of knowledge management.
- To analyze the role of adhocracy in ensuring effective knowledge management.

### Research Questions

- What is the importance of knowledge management in an organization?
- Which key steps are involved in the process of knowledge management?
- Does adhocracy affect knowledge management in the Turkish construction industry?

## **BACKGROUND**

### **Knowledge Management**

The concept of knowledge management is not new; however, the terminology is quite new. It is quite difficult to find the exact definition of knowledge management. Ode and Ayavoo (2020) claimed that

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knowledge management is a process of leveraging integrated wisdom for the purpose of increasing responsiveness and innovation. Moreover, Iqbal et al. (2019) stated that knowledge management consists of three key elements, which include people, process, and technology. Knowledge management includes a planned activity in a firm and consists of a process of identifying key knowledge, generating new knowledge, and transferring knowledge between and among the employees of the organization. It is important to embed all these processes in the overall operation of companies and it should be considered an important part of the firm's culture and should be dependent on related information technology. Knowledge management is highly related to employees, so it must have harmony with human resource management policies. The significance of knowledge in an organization can be understood through the resource-based and knowledge-based theories. The knowledge-based theory supposes that the most significant source of sustainable competitive edge is the ability to create and use knowledge (Okere, 2017). It is important to use knowledge to represent the foundation of the company's strategy. This means that all employees must understand the importance of knowledge as a key factor for sustaining performance. The knowledge in an organization is important for representing the strategy of that firm. Hence, the top management of an organization should understand knowledge as a main factor of sustained and improved performance. Effective knowledge management is the storage and retrieval of knowledge for the purpose of improving understanding, process alignment, and collaboration. Effective knowledge management in an organization depends highly on strong support from the management, a key factor of systematic knowledge management. Due to the increased significance of knowledge, the need for systematic management is further enhanced. Effective knowledge management in an organization is important for ensuring improved performance. Systematic knowledge management in a company consists of efforts made for maximizing the success of the firm with the help of creating and exchanging knowledge and skills. It is important for both the management and employees of an organization to have a proper understanding of knowledge and the ways of efficiently using this knowledge (Lee et al., 2016a). Lee et al. (2016b) found that the importance of efficient knowledge management has been increased due to the need of firms who wish to operate successfully in the competitive business world to maximize the efficient use of resources. The key objective of knowledge management is not knowledge itself, but the effective management of human resources where such knowledge is possessed. Human resource management is considered a key challenge throughout the lifecycle of a firm.

Knowledge management is a process that consists of five key stages: knowledge creation, knowledge validation, knowledge presentation, knowledge distribution, and knowledge application. With the help of these five stages, an organization becomes capable of learning, reflecting, unlearning and relearning. This process is often referred to as highly important to build, maintain, and replenish the core-competencies of a firm (Omotayo, 2015).

### **Knowledge Creation**

The first step in the knowledge management process is the capability of a firm to develop innovative and useful ideas and solutions. With the help of reconfiguration and recombination of background knowledge, a company can become capable of creating new realities and meanings (Muller, 2018). Knowledge creation is an initial process where motivation, experimentation, and inspiration all play important roles. The degree to which innovative knowledge is known depends on the ability to solve problems in a more proficient and effective manner (Wiener et al., 2018).

*Figure 1. Knowledge management process*

*Source: (Iqbal et al., 2019)*



Knowledge within an organization is created with the help of strong collaboration and interaction. Knowledge creation is done through sharing and converting different types of knowledge (Girard & Girard, 2015). Besides, it should be noted that the existence of relevant data and information has a significant role in creating knowledge. The management in an organization is responsible for providing right forums to create useful knowledge (Islam et al., 2018).

### Knowledge Validation

Knowledge validation is the second step in the process of knowledge management. It is linked with the degree to which an organization can reflect on knowledge and focus on evaluating its effectiveness for the current environment of the firm (Halim et al., 2019). With the passage of time, there is a possibility of having some obsolete parts of knowledge, which requires reconfiguration and refinement to current realities (Iqbal et al., 2019). Often, there is a need for different and continual interactions between approaches, employees, and technologies for the purpose of testing the validity of knowledge. This is known as a painstaking process where knowledge is continuously monitored, tested, and refined to adapt to potential realities (Islam et al., 2018).

Knowledge validation is considered an important process in the lifecycle of knowledge management. It is important to verify the knowledge base that is incorporated into systems. It is important to use effective approaches for developing specialized processes and techniques, ensuring high quality of knowledge (Halim et al., 2019). The validity of knowledge is tested through ensuring its consistency and

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harmony with other key ideas and concepts. It is important to use knowledge that is consistent with the key mission, vision, and goals of the organization. Hence, knowledge validation is an important step in the knowledge management process (North & Kumta, 2018).

### **Knowledge Presentation**

According to Wziątek-Staśko et al. (2020), knowledge presentation includes ways of displaying knowledge to the members of the firm. Organizations often devise various processes to format the knowledge base. However, Muller (2018) argued that the distribution of knowledge is done in various locations and the storage of knowledge is done in various sources like optical media or print media.

It is always important to use and display knowledge in an appropriate manner. It is not enough to create and validate knowledge in an organization; its presentation in the right form is also important for the success of the organization. The right display of knowledge at the right locations is key to ensure effectiveness and utilization (Halim et al., 2019).

### **Knowledge Distribution**

After knowledge presentation, there is a need to distribute and share knowledge throughout the company before utilizing it at the organizational level (Girard & Girard, 2015). However, it should be noted that there can be a direct link between techniques, people, and technologies in an organization regarding knowledge distribution. Interactions can get minimized with the help of knowledge distribution through complete supervision over a predetermined channel (Kraśnicka et al., 2018).

Appropriate knowledge distribution plays an important role in the success of an organization. A firm cannot succeed unless and until the knowledge in that organization is distributed properly and effectively. Hence, knowledge distribution is one of the most important steps in the process of knowledge management (Iqbal et al., 2019). It is crucial to use effective strategies for distributing knowledge effectively. The distribution of knowledge should be done to all members so that they can utilize that knowledge for the benefit of the firm (Anitha, 2016). It is highly important to have effective knowledge management practices within an organization to ensure high productivity and performance. When managers of an organization give importance to effective knowledge management, this ultimately helps enhance the motivation levels of employees. A focus towards effective knowledge management means that the managers give importance to enhancing the key skills, abilities, and competencies of employees. This eventually motivates employees, as they feel valued and give more importance to using learnt skills, knowledge, and abilities for achieving both individual and organizational objectives (Halim et al., 2019).

### **Knowledge Application**

According to North and Kumta (2018), firms need to employ knowledge in their products, services, and overall processes. When the management of a firm does not appropriately apply the knowledge, they cannot succeed in sustaining their competitive edge. The process of knowledge application means enhancing activeness in terms of knowledge and enhancing its relevancy to create values (Rohim & Budhiasa, 2019).

As the last step of the knowledge management process, this is highly important, as it includes the right utilization of knowledge. Knowledge should be applied at the right places to ensure success. Each

department in an organization requires different types of knowledge, so appropriate knowledge application in each department is highly important (Cameron & Quinn, 2011).

## **Organizational Culture**

Organizational culture is defined as a collection of common norms, values, and standards within an organization. Moreover, it includes competitiveness, support innovation, social responsibility, and performance. Organizational culture is a multi-dimensional concept (Halim et al., 2019). It is crucial for configuring the reputation and identity of an organization in relation to its environment. Values are rather visible expressions of an organizational culture because members of the firm have more awareness of key values. The values in an organizational culture can work as an approach towards social control and establishment of what type of behaviors are correct or incorrect (Martínez-Costa et al., 2019).

According to the findings of Anitha (2016), culture is the key factor used to assess success or failure in companies. There are various elements of organizational culture. It is important to have normative themes of organizational culture, which present social prospects and values. The management is responsible for centralizing the values and faiths of individuals for the purpose of bonding employees together. This culture not only includes values and morals but it also constitutes a significant set of material themes, like events, individuals, and behaviors. Appannah and Biggs (2015) explained that values are the most important element of organizational culture, strongly supporting bonding between people in any organization. Hence, values are one of the most important aspect of organizational culture. The culture of the owner is also considered an important element that plays a key role in shaping organizational culture. It helps motivate employees for knowledge sharing activities and assess important information in the company. According to Mohelska and Sokolova (2015), another important aspect of organizational culture is organizational structure. The structure of an organization has a significant impact on its competence and management style. Moreover, reward systems, rituals, and symbols are also major elements of organizational culture. Organizational culture has a fundamental role for businesses to have a strong structure and to achieve organizational power. A strong organizational culture is always needed for a strong organization.

## **Competing Values Framework**

This research study is based on the Competing Values Framework (CVF), established by Cameron and Quinn (2011). This model basically consists of two key dimensions; one is about flexibility and discretion and the other is about stability and control. Through the combination of these dimensions, four unique types of cultures are identified: clan culture, market culture, adhocracy culture, and hierarchy culture. The focus of this study will be on investigating the impact of adhocracy culture on effective knowledge management in the case of the Turkish construction industry.

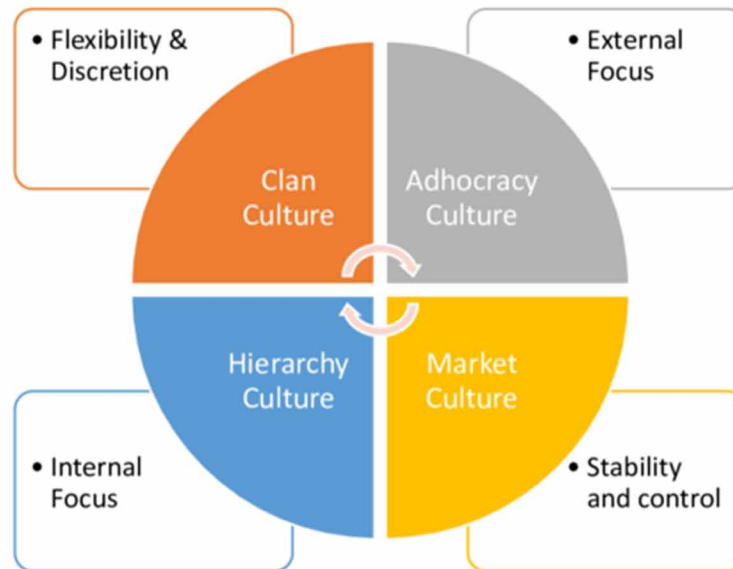
## **Adhocracy Culture and Knowledge Management**

Adhocracy is known as an original, innovative, and entrepreneurial culture where individuals are always prepared for change and flexibility. An organization that possesses adhocracy culture often pursues success while giving importance to developing innovation. The key focus of adhocracy is on knowledge sharing among employees, ultimately resulting in innovation and enhanced productivity (Lee et al.,



*Figure 2. Competing Values Framework*

Source: (Cameron & Quinn, 2011)



2019). Adhocracy is an innovation-oriented culture, in which the main focus is on fostering adaptability, creativity, and flexibility for the purpose of overcoming uncertainty, overloaded information, and ambiguity (Pawar & Shaikh, 2020). According to Tran (2020), adhocracy culture is a good enabler of conversion of knowledge in comparison to clan and hierarchy cultures. The key thrust of adhocracy is ‘to create,’ which is basically linked with the creation of knowledge and bringing innovation. Halim et al. (2019) argued that it is highly important for managements to develop an adhocracy culture for ensuring effective transmission of knowledge from one individual to another. This leads to high productivity within the firm. With adhocracy culture, people are more inclined towards taking risks and they do not hesitate when sharing knowledge with others.

Martínez-Costa et al. (2019) argued that when an organization does not include an environment in which knowledge sharing is encouraged through expectations and incentives, it is not possible to implement knowledge management successfully. The presence of adhocracy is considered an important factor for ensuring easy implementation of knowledge management. Along with the presence of adhocracy, it is also key to have some other elements like effective leadership, effective human resource management practices, and organizational structure. According to the findings of Koko and Makumbe (2020), there are certain values that motivate or hinder the development, dissemination, or application of knowledge within the firm. Accordingly, through a high level of trust and coordination, employees become capable of sharing knowledge and value systems through which individual power is highlighted and can be generated. Similarly, Islam et al. (2018) claimed that there is a significant impact of key values and norms of adhocracy culture on the willingness and interests of knowledge owners for sharing knowledge with

other members of the firm. Research reveals that thanks to the existence of specific values, a greater tendency of sharing knowledge is promoted. It is important to establish a clear perception of who has a specific information and this implies a great utilization of collaborative sources of sharing and exchanging knowledge. Ode and Ayavoo (2020) claimed that organizational culture, which is referred to as a set of norms and values and in which trust and cooperation are included, plays a positive role in the process of knowledge creation. The culture of an organization works as a social control process, oriented towards a key system, either stimulating or hindering the process of creating and disseminating knowledge within the firm.

It is important to ensure active engagement of all participants in the process of creating knowledge in an organization. With the help of effective communication between employees, contribution is made to the transfer of knowledge, making it significant for organizations to develop a culture where communication is properly encouraged. Knowledge sharing has a key role in enhancing exposure to various ideas and providing various sources of information. The innovation in an organization can get fostered through transfer of knowledge and information at both individual and organizational levels (Chang & Lin, 2015). The transfer of knowledge can be imagined as a flow of fragments of individual knowledge in a network of employees. In this sense, social interaction and desire to cooperate has a major role. Transfer of knowledge can take place in one stage, like directly from a sender to a recipient. Moreover, it also depends on developing an atmosphere of collaboration and trust (Abubakar et al., 2019). Knowledge development is critical for firms for storing knowledge and providing access to it efficiently within the firm. This consequently helps achieve a sustainable competitive edge. It is important to ensure open access to knowledge sources. The most significant element, however, is the way of storing knowledge. It is crucial to allow rapid and efficient search for and specifically to update knowledge. In storing knowledge, it is important to collect and process knowledge in electronic form and some part of it in the form of books, plans, and documents (Asrar-ul-Haq & Anwar, 2016).

Even though there have been studies on the influence of adhocracy culture on knowledge sharing, none has focused on investigating the impact of adhocracy on effective knowledge management in the context of the Turkish construction industry. So, based on this, the following hypothesis was developed:

**Hypothesis One:** Adhocracy culture has a significant impact on effective knowledge management.

There are different types of organizational culture; however, in the current competitive business world, adhocracy is one of the most demanding types of culture as it is related to innovation and entrepreneurship. The focus of this study is to investigate the key influence of adhocracy on effective knowledge management. This hypothesis has been tested using regression and correlation statistical techniques. The key focus is on understanding the relationship between adhocracy and effective knowledge management, especially in the context of the Turkish construction industry.

## **METHODOLOGY**

### **Research Design**

This research had a cross-sectional design. To analyze the links between adhocracy and effective knowledge management, quantitative methods of research were used. Kumar (2018) identified that the researcher gets more information with the help of primary data. Also, according to Flick (2015), primary data tends to have more benefits and can be managed easily. Therefore, primary data was used in this research to

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analyze the relationship between adhocracy culture and effective knowledge management. Researchers use different methods or approaches for collecting primary data. Here, a questionnaire was used. The questionnaire consisted of different sections, including questions related to adhocracy and knowledge management. Since the focus of the study was to examine the impact of adhocracy culture on knowledge management, it was important to have two different sections for each variable to test their correlation.

The target of the current research is to analyze the links between adhocracy culture and knowledge management in the construction industry in Turkey; therefore, the population of this research comprises all construction firms operating in Turkey. Convenience sampling strategy was used. Consumers who were easily accessible by the researcher were included. Among the population, 201 employees working in the construction industry in Turkey were selected as the sample. In accordance with Kumar (2018), the sample size of this research was kept at 201 to ensure high reliability and generalizability.

The primary data in current study was collected using a questionnaire. The adhocracy culture variable was measured through the source of Gaál et al. (2010) and the knowledge management variable was measured by the instrument used by Fong and Kwok (2009). The questionnaire was developed based on a five-point Likert scale. After data collection, regression and correlation analysis techniques were used for data analysis. These statistical techniques helped in investigating the relationship between the two variables.

As per the suggestions of Kothari (2004), this research has considered all ethical standards. There was no enforcement over the participants to fill the questionnaire. The respondents were capable of participating in the questionnaire on a voluntary basis. Moreover, the researcher ensured that the data of respondents was not shared with anyone. No third party was permitted access to data of consumers collected in the given research. Also, all participants signed a formal consent for their participation.

## **RESULTS**

### **Demographic Analysis**

*Table 1. Sex distribution*

	<b>Frequency</b>		<b>Percent</b>
Valid	Male	119	59.2
	Female	82	40.8
	Total	201	100.0

The data in current study was collected from 201 employees working in the Turkish construction industry. Among those respondents, there were 82 females and 119 males. This means that the construction industry of Turkey consisted more of males compared to females.

The participants were asked about their experience in working within the construction industry. As per the analysis, it was found that 10% of the respondents had an experience of 1 to 3 years, 48% 7-9 years, and 21% more than 9 years. Among the 201 employees, there was a greater number of employees with 7-9 years of experience.

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*Table 2. Experience*

	Frequency	Percent	
Valid	1-3 years	21	10.4
	4-6 years	42	20.9
	7-9 years	96	47.8
	More than 9 years	42	20.9
	Total	201	100.0

*Table 3. Reliability statistics*

Cronbach's Alpha	N of Items
.799	2

### Reliability Analysis

As the primary data in the current study was collected through a questionnaire, a reliability analysis was done to test the reliability of the questionnaire used in the study. The Cronbach's alpha value for the questionnaire was 0.799, which is greater than 0.6. Hence, the questionnaire was considered reliable.

### Correlation Analysis

*Table 4. Correlation statistics*

		AC	KM
AC	Pearson Correlation	1	.665**
	Sig. (2-tailed)		.000
	N	201	201
KM	Pearson Correlation	.665**	1
	Sig. (2-tailed)	.000	
	N	201	201
**. Correlation is significant at the 0.01 level (2-tailed).			

To test the strength of the relationship between adhocracy culture and knowledge management, correlation statistics were used. Based on table 4, it can be seen that the Pearson correlation value for the relationship between AC and KM was 0.665\*\*, which suggests a moderate significant and positive relationship between adhocracy culture and knowledge management.

## Regression Analysis

*Table 5. Model summary for regression statistics*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.665a	.442	.439	.39242
a. Predictors: (Constant), AC				

Table 5 includes the R square value, which tells the change in knowledge management resulted due to one unit of change in adhocracy culture. The R square value was 0.442, which means that one unit of change in adhocracy culture would bring an increase of 44.2% in effective knowledge management.

*Table 6. ANOVA*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.276	1	24.276	157.640	.000b
	Residual	30.645	199	.154		
	Total	54.921	200			
a. Dependent Variable: KM						
b. Predictors: (Constant), AC						

The study consisted of a hypothesis related to the relationship between adhocracy culture and effective knowledge management. So, as the value of F was greater than one (157.640) and significance value was 0.000, which is less than 0.05, the hypothesis of the research was accepted.

$$Y (\text{Knowledge Management}) = \pm + 0.676 X (\text{Adhocracy Culture})$$

Table 7 includes the beta value (0.676) for the relationship between adhocracy culture and effective knowledge management. This means that a 1% change in adhocracy culture would change knowledge management by 67.6%.

*Table 7. Coefficients*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.198	.197		6.070	.000
	AC	.676	.054	.665	12.555	.000
a. Dependent Variable: KM						

## **DISCUSSION**

In the current research study, it was revealed that adhocracy culture had a significant impact on effective knowledge management. When companies adopt adhocracy culture, they give importance to trust, openness, and innovation. While following an adhocracy culture, the employees working in an organization focus on taking risks and bringing innovation. As a result, they start focusing on learning new skills and competencies, which ultimately results in effective knowledge management. This is consistent with the findings of Lee et al. (2019), who claimed that when employees are provided with an open environment and are free to take decisions, this leads to effective knowledge management within the firm. Besides, it has also been found that adhocracy culture is a type of organizational culture that is highly important for enhancing and improving the capabilities of knowledge management. The existence of adhocracy is important for improving knowledge infrastructure capacities. Consequently, the effectiveness of the whole organization is improved (Halim et al., 2019). Similarly, the findings of the current study revealed that the management of an organization is required to give considerable importance to creating values that are linked with support, trust, and openness. Such values and norms in an organization can prove to be helpful in making employees capable of sharing knowledge and innovative ideas. This is consistent with the findings of Krašnicka et al. (2018), who claimed that such values and norms that encourage employees to share innovative ideas are useful for bringing innovation within the firm. Moreover, such types of norms and values are also helpful in making employees and the firm capable of taking advantage of new opportunities.

This study also revealed that successful and effective knowledge management depends highly on having a dynamic workforce and workplace. A dynamic workplace is linked with more innovation and creativity. This is similar to the study conducted by Martínez-Costa et al. (2019), who stated that the key element of adhocracy is 'to create,' which is relevant to knowledge creation and bringing innovation. The management of an organization is responsible for developing adhocracy culture to ensure effective transmission of knowledge from one individual to another. As a result, the productivity of the organization gets enhanced. So, existence of adhocracy culture within a firm leads to making people more inclined towards taking risks and they do not hesitate when sharing knowledge with others. This study revealed that one of the key aspects of effective knowledge management is creating an environment where people trust each other and are willing to share their knowledge with others to contribute to successful performance. Calvo-Mora et al. (2015) claimed that knowledge management is a process of continuously managing all kinds of knowledge to realize set objectives, to properly take advantage of the current knowledge, and to create new and exciting opportunities. Similarly, Iqbal et al. (2019) stated that knowledge management includes a formal process, according to which knowledge is efficiently used by employees and is transferred to the right people at the right time. Knowledge management is considered an activity with high consistency in terms of human capital management. When the management and the employees get involved in the process of knowledge management, they get engaged in identifying and analyzing the available knowledge and a complete process of planning to realize their set objectives and to increase the capital of the firm. As per the findings of the current study, it was found that adhocracy culture plays a key role in enhancing knowledge management capabilities. When there is a presence of adhocracy culture in an organization, this ultimately helps in enhancing the capabilities for effective knowledge management. Lee et al. (2019) also claimed that adhocracy is linked with knowledge management capabilities. When a company has strong knowledge infrastructure capacities, this results in improved knowledge management capabilities, further developing the effectiveness of the

firm. When companies have values oriented towards openness and support, they can develop behaviors through which employees get engaged in sharing more innovative ideas and knowledge. This eventually improves innovativeness within the firm and makes it more capable of showing response to change and market opportunities in an easier manner.

## **Future Research Directions**

Future research can study the impact of other types of organizational cultures such as empowered culture, innovation culture, or entrepreneurial culture on effective knowledge management. Moreover, future research studies can also focus on investigating the moderating impact of transformational leadership on the relationship between adhocracy culture and knowledge management. This study focused solely on the construction industry of Turkey, so the findings obtained here cannot be generalized to other industries. Therefore, further studies on other industries are needed. Finally, future research should consider including larger samples for enhancing the validity and generalizability of the results.

## **CONCLUSION**

The focus of this research study was on investigating the importance of adhocracy culture in terms of ensuring effective knowledge management. The study revealed that adhocracy culture has a significant impact on effective knowledge management practices in the case of the Turkish construction industry. It is important for the management of an organization to provide support to employees and encourage them to take risks. When such support is provided to employees, they feel motivated to share their ideas and perceptions with others. This helps develop a supportive culture within the organization; thus, effective knowledge management practices can be achieved. The freedom of employees is very important for ensuring successful transfer of knowledge from one employee to another and to the management. When the managers in an organization focus on developing an adhocracy culture, this leads to higher creativity and innovation and employees start focusing on sharing important knowledge and information with each other. Hence, adhocracy is key for ensuring effective knowledge management within the firm.

This research study has theoretical implications in terms of adding value to the literature through specifically focusing on adhocracy culture. There are different types of organizational culture and every single one has a different impact on knowledge management practices followed within firms. Hence, this research study is quite interesting in terms of having a specific focus on adhocracy culture. This type of culture is important for ensuring effective knowledge management practices. So, scholars and researchers in the field of management can get further directions for conducting future research studies on other types of organizational culture that are important for ensuring effective knowledge management.

The findings of this study are useful for managers working in the construction industry of Turkey to take guidance regarding the importance of adhocracy culture in ensuring effective knowledge management. Through this research study, they can get to know about specific aspects of adhocracy culture, which need to be focused for the purpose of ensuring effective knowledge management within the firm. Hence, this can prove to be useful for enhancing performance and productivity. Since the construction industry works on the basis of projects, knowledge management plays an important role here. It is always significant to give considerable attention to providing freedom and extra support to employees so that they feel encouraged to play their positive role in improved performance and competitiveness. This research

study is beneficial for managers, as they can get an understanding about what type of culture must be developed within an organization to ensure that their employees share and transfer their knowledge and understanding with each other and with the management.

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## **KEY TERMS AND DEFINITIONS**

**Knowledge Application:** It refers to the process to employ knowledge to products, services, and process of the organization with the intention to enhance the effectiveness of knowledge which is created, validated, and distributed.

**Knowledge Creation:** It refers to the process to create new realities and meanings through motivation, inspiration, and experimentation.

**Knowledge Distribution:** It refers to the process of distribution and sharing of knowledge among organizational level through various interlinked techniques, people, and technologies.

**Knowledge Management:** Knowledge management is planned activity which consists of a process of identifying, generating new and transferring knowledge among organizational members.

**Knowledge Presentation:** It is a way to display knowledge to organizational members where an appropriate knowledge base is devised at various locations and sources.


**Knowledge Validation:** It is a process to reflect and evaluate the effectiveness of knowledge through verification, refinement, and reconfiguration.

**Organizational Culture:** It consists of organizational shared norms, values and standards which decides the way of behaving, thinking, and acting in any organization.

# Chapter 7

## Knowledge Management in Large Complex Organizations: The Subcultural Level

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### ABSTRACT

*This chapter considers the effect of subcultures in large complex organizations upon knowledge management. It is found that subcultures offer both advantages and disadvantages to organisations with knowledge management processes. On the one hand, the diversity of subcultures also offers a diversity of approaches and focus of knowledge management within subcultures. On the other, subcultures are found in the literature to present boundaries to cross-subcultural knowledge transfer. In essence, knowledge management is enhanced within subcultures, and there is a diversity of knowledge management processes as well as conversion of different types of knowledge specific to each subculture type, but knowledge sharing and transfer between subcultures is problematic. Through the examination of previous empirical studies and evidence from the author's own study, strategies are suggested along with a proposed model for managing knowledge across subcultures in large complex organisations, and further implications are highlighted for researchers and practitioners.*

### INTRODUCTION

Effective knowledge management (KM) in organisations can produce a range of benefits, such as higher productivity, improved performance, and improved innovative capabilities (Mesmer-Magnus & De Church, 2009). Despite these benefits, there is no guarantee that all employees are on board with knowledge management practices such as knowledge sharing and transferring. Thus, management must ensure full support for creating and managing knowledge assets effectively (De Long & Fahey, 2000) and remove obstacles to knowledge management initiatives. One of the key themes that has evolved in the research of subcultures and knowledge management is whether subcultures are obstacles to be removed or rather

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champions of knowledge management processes. This chapter will cover this debate using empirical studies and the author's own research work in these areas, as a means of revealing more about the role of subcultures in knowledge management in large complex organisations.

This chapter comprises the general background of the topic, empirical studies currently in the field, an empirical study of the author, and a discussion of the implications, alongside recommendations for practitioners and researchers, and conclusions.

The background section covers the two main elements of the chapter: subcultures and knowledge management. The role of subcultures in organisations is presented along with the existing empirical studies on the type and role of subcultures in general, including operational definitions. Knowledge management is considered from a theoretical perspective. The second section covers existing empirical studies of the role or potential role of subcultures in knowledge management, i.e., the link between organisational culture and knowledge management.

In the third section, an empirical study of a large complex organisation is introduced. Subcultures are identified in the organisation using a quantitative method employed by Hofstede (1998). It is found that despite the literature suggesting subcultures are often at odds with the organisation and barriers to knowledge sharing, there are in fact commonly shared values that permeate through the entire organisation, including the subcultures. However, this does not mean all values are shared; there is evidence that the subcultures perceive the organisation as having a different culture based on bureaucracy and rules, despite those same staff actually valuing flexibility and discretion. In this way, not only differing values but differing perceptions of the organisation's overarching culture may act as a barrier to knowledge management incentives set by the organisation.

The fourth section is entitled 'solutions and recommendations' and expounds on the implications for practitioners and researchers, as well as presenting the key findings from the study referred to in the previous section. It concludes with a model for practitioners to launch knowledge management initiatives in large complex organisations where subcultures are likely to emerge. Further insights are also offered for practitioners looking to improve knowledge management in large complex organisations. This may be especially useful in the human resource management and strategic communications fields. Finally, possible fruitful research directions are suggested for academics and researchers.

## **BACKGROUND**

In this section, the two main elements of this chapter are examined from a theoretical perspective: subcultures and knowledge management.

Culture is the glue that holds the organisation together as employees share values and beliefs. It is described as the way employees act in organisations (Deal & Kennedy, 1983). However, there is some debate as to the suitable perspective that should be adopted when examining the culture in organisations. There are three perspectives to consider. The first is the unitarist perspective, where there is a unity of values, beliefs and norms to the extent that an organisation's culture can be assessed and categorized as belonging to a certain type. An example of this can be seen in the work of Handy (1993) who suggested four culture types: power, task, people and role-oriented cultures. The power culture is focussed on control that is propagated like a network, from the centre to the rest of the organisation, which is why it is often symbolised with a spider's web. Examples of companies that value this combination of networking and power (and politics) are Small and Medium-sized Enterprises (SMEs) in property, trading

and finance. The task culture is job-focussed with stress placed on teamwork and completing the task. For this culture type, power exists in the form of experts relating to the job and staff are expected to be compliant (Handy, 1993, p.188). In a person culture, the employees are mostly experts and ‘go their own way’, as they know best what needs to be done and how. Although it is difficult to imagine an organisation full of experts in reality, in theory the employees see themselves as above the organisation, making them difficult to manage – especially as they are able to easily find alternative employment. Finally, the role culture is linked to a structured organisation, with clearly stated responsibilities and authority. In this way, the culture is oriented towards rationality, reinforced with clear rules and procedures. The need for a clear structure can help in job security for employees but it also may indicate, according to Handy (1993), that the authority of those employees in a higher position may not be gained as a result of expertise. The internal focus of the role culture may also mean slower reactions to external changes, such as changing customer tastes, technology and competitor activity.

With the unitarist perspective, there is room for cultural complexity such as the model put forward by Cameron and Quinn (2011). The model suggests that one single type of culture is unlikely to exist in an organisation as some employees will be primarily internally focused on the working and procedures of the organisation, such as in Health and Safety, whereas other employees in the same organisation will be focused externally on customers, suppliers, and so on. In this way, Cameron and Quinn (2011) put forward a ‘Competing Values Framework’. According to this model, each organisation is composed of four different culture types at the same time (market, hierarchy, clan and adhocracy). These types will be expounded upon later in the chapter.

From a knowledge transfer standpoint, whether organisations are seen as having a single culture type or four simultaneous types, the unitarist perspective achieves unity through top-down communication and leadership, which is why it is also referred to as the ‘integration perspective’ (Martin, 1992). The debate arises when considering large, complex organisations. Imagine an organisation based in different locations, and fragmented by functions focussed either externally or internally, and a highly diverse workforce. What are the chances of all the employees having the same identical values and behaviours? The idea of employees having common beliefs and norms seems rather strained in such organisations and, despite research suggesting this for some time (Gregory, 1983; Kuh & Whitt, 1988), both practitioners and researchers often opt for a unitary perspective of culture for large complex organisations.

The second perspective is the pluralist perspective, which sees organisation culture as divided into groups of subcultures. A subculture is a group of employees who have different values and norms compared to the overarching culture of the organisation. This does not mean every single value and norm is at odds with the organisation’s value and norms. The work of Schein (1988) determined that employee values may be split into two types: pivotal and peripheral. Pivotal are those that are believed to be crucial to working life, and peripheral are those values that are less important. With this in mind, Schein (1988) suggests three subcultural categories based upon the extent to which values are in line with the organisation’s values. An enhancing subculture is one where both the pivotal and peripheral values held by the subculture are the same as the organisation. An orthogonal subculture is one where the pivotal values are the same, but the peripheral are different. A counter subculture (counterculture) is one where both the pivotal and peripheral values are at odds with those of the organisation. The pluralist perspective is concerned primarily with orthogonal and counter subcultures.

Examples of these three types of subcultures emerging in organisations have been found in a wide range of organisations, from supermarkets (Ogbonna & Wilkinson, 1990) through to Higher Education Institutions. In these pluralist cultures, unity is replaced by diversity. This does not mean that subcultures

are necessarily counter to the desired direction of the organisation (Boisnier & Chatman, 2003) and represent obstacles to organisational plans and initiatives. However, it does indicate a greater potential for conflict compared to the unitarist perspective (Martin, 1992). Knowledge transfer and sharing may be problematic across heterogeneous subcultures that see the other subcultures as competing or as ‘tribes protecting their territories’ (Becher, 1987).

The third and final perspective is known as the fragmentation perspective. In this case, there is so little unity that even subcultures do not exist. Instead, the organisation is made up by individuals with widely differentiated values, beliefs and norms (Martin, 1992). For knowledge management, this perspective presents immense challenges. Hofstede et al. (1990) found the focus in heavily fragmented organisations to be on communication and diversity management. Moreover, the fragmentation is likely the result of individuals becoming isolated as they are faced with ambiguity and uncertainty, resulting in confusion (Martin et al., 2006).

From a cultural perspective, what happens within subcultures would be the same as what would happen within a unified culture. In other words, a ‘person subculture’ would be expected to have the same norms and values as a ‘person culture’ of a single (small) organisation. Likewise, a clan subculture would handle knowledge transfer in a similar way to a unified clan culture. As this chapter focusses on the peculiarities of subcultures with regard to knowledge management, greater focus will be placed on how subcultures act as parts of the ‘organisational machine’ with respect to various aspects of knowledge management, rather than what happens within subcultures, which is covered well in existing literature (e.g., Chin-Loy & Mujtaba, 2007; Adeinat & Abdulfatah, 2019; Singh, 2020).

For those practicing knowledge management, the unitarist perspective is often preferred as it reinforces the desire to share and transfer knowledge with employees conforming to initiatives and all employees experiencing a unity of direction. However, the reality in large complex organisations is that subcultures exist, according to the literature. Some subcultures emerge based upon location, age, gender, or even occupation (Trice & Beyer, 1993).

Turning the focus to knowledge and knowledge management. Knowledge is the asset enabling the learning and utilization of organisational resources (Argote & Miron-Spektor, 2011). Thus, knowledge management (KM) is crucial if an organisation wants to maintain the levels of efficiency and productivity required to stay ahead of the competition (Kogut & Zander, 1992). For this chapter, the operational definition of knowledge management is: “an entity’s systematic and deliberate efforts to expand, cultivate and apply available knowledge in ways that add value to the entity, in the sense of positive results in accomplishing its objectives or fulfilling its purpose” (Holsapple & Joshi, 2004, p. 596).

In this chapter, the focus is on large complex organisations. This does not necessarily refer to multinational organisations, but to large organisations that may be considered complex due to, for example, a range of different geographical locations, such as a university with an administrative headquarters and campuses spread out over the country, or a large domestic company with a logistics depot, separate headquarters and separate factory. Complex structures, systems and other elements may also add to the complexity of large organisations. For large organisations, organising knowledge is particularly challenging, with diverse individual and group needs (Serban & Luan, 2002).

From a cultural perspective, there is one key aim of knowledge management that may be enhanced or obstructed by organisational culture: to encourage employees to share knowledge (Martinez, 1998). Gul et al. (2020) undertook a literature review of 169 articles dealing with the theme of the knowledge management and organisational culture. They found that there is an obvious research gap in the literature on the link between knowledge management and organisational culture, as most studies do not go beyond



the organisational culture level when examining the role of subcultures in the sharing and transfer of knowledge process. In this way, many key issues are overlooked, which is a concern when the likelihood of subcultures emerging in large complex organisations is high (Boisnier & Chatman, 2003). One example of such an issue is how subcultural boundaries may obstruct the distribution and use of knowledge in organisations (Davenport, 1994). The following section will consider further this link between knowledge management and subcultures, highlighting existing research that may be applied to this context.

## **ORGANISATIONAL CULTURE AND KNOWLEDGE MANAGEMENT**

Before considering the empirical evidence for the role of subcultures in knowledge management, this section will first present a general view of the link between culture and knowledge, as well as empirical studies examining the link between organisational culture and knowledge management.

Culture and knowledge management are inextricably intertwined. Davenport and Prusak (2000) consider knowledge as a combination of experience, values, contextual information, and expert insight through which new experiences and information are appraised and adopted. In this way, the key role of values and experience, the pillars of organisational culture, are clearly seen as also belonging to the development of knowledge. Cavaliere and Lombardi (2015) suggest organisational culture is an antecedent to the transfer of knowledge since culture provides context and meaning to knowledge. Gul et al. (2020) provide a list of elements that interact between culture and knowledge management:

*The characteristics of organisational culture and transfer of knowledge reveal the organisational culture and transfer of knowledge have similar building blocks e.g., both are dependent on people for creation and continuity, both are the result of collective behaviors, both require networking or social ties to originate and flourish and similarly, both are processes that require structures and channels. (p.158)*

As referred to in the previous section, both knowledge management and organisational culture are problematic from a definition standpoint and can be difficult to measure, such as in the case of observing and assessing subcultural behaviours or evaluating the transfer of tacit knowledge between employees.

Beyond these similarities a symbiotic relationship between organisational culture and knowledge management is apparent. Organisational culture may influence the transfer of knowledge as seen in the case of adhocratic cultures (Cameron & Quinn, 2011) that exhibit values and norms relating to innovation, creativity and adaptability. In such cultures, the creation of new ideas, as well as their sharing and implementation is supported, much in line with elements of open innovation (Chandler & Krajcsák, 2021). On the other hand, adhocratic cultures are also seen as problematic when it comes to initiating the transfer of knowledge (Cameron & Quinn, 2011). Conversely, if transfer of knowledge is valued by members of an organisation, then the transfer of knowledge is more likely to be encouraged and the benefits of this transfer between individual employees may be appreciated to a greater extent (Jansen et al., 2005). Moreover, if an organisation pushes for the creation of ideas and sharing thereof, then there is a greater propensity for an adhocratic culture to emerge and/or expand.

Alavi et al. (2005) examined the effect of organisational culture on knowledge management technology, employing a case study methodology. In their study, the assumption was that organisational values shape knowledge management behaviours. In their study, they collected data through conducting semi-structured interviews with 20 professional employees, as well as analysing the content of documents relevant to their

study. They found that cultural values influence an organisation's approach to knowledge management, as well as the choice of technology or tools to be used for the application of knowledge management. A later study also examined the effect of organisational culture on knowledge management, but in the context of higher education. Biloslavo and Prevodnik (2010) assessed the organisational culture of a range of different faculties in two Slovenian higher education institutions. However, their findings are somewhat inconclusive. They used the Organisational Culture Assessment Instrument (OCAI) developed by Cameron and Quinn (2011) and this is also used in the author's empirical study that is presented later in this chapter. Although the instrument prescribes organisational culture as having four types (market, clan, adhocracy, and hierarchy), they only found significant relationships between knowledge management processes and two culture types: the clan and market culture types.

Abdi et al. (2018) studied how organisational culture and knowledge management influenced organisational innovation, alongside the role of organisational learning as a mediator. Although they found that knowledge management was not acting as a mediator in the relationship between organisational culture and organisational innovation, they made the assumption that organisational culture is related to knowledge management and that in fact successful knowledge management depends on the organisational culture, especially in the context of innovation (Taleghani & Talebian, 2013).

Studies of the link between organisational culture and knowledge management offer support for practitioners in how to develop their organisational cultures to encourage and maintain knowledge management processes (Akhavan et al., 2014). Despite this, few studies, to the author's knowledge, have considered the potential link between organisational subcultures and knowledge management. In the following, the studies that have delved into this aspect are examined to discover how subcultures may impact knowledge management in large complex organisations.

Gray and Densten (2005) present a model that merges organisational culture types and knowledge management. The reason for this is stated by Gray and Densten (2005) as: models of knowledge management and organisational culture have a common assumption that human relations and socialization are the key processes for encouraging knowledge sharing. However, there are some culture types are more conducive to certain aspects of knowledge sharing than others. The clan culture develops relationships based upon trust and a need for belonging that support the sharing of knowledge (Cameron & Quinn, 2011). In contrast, the market culture operates with stability and control and a rationalistic approach that provide a means for breaking down explicit knowledge and operationalizing corporate knowledge (Gray & Densten, 2005). Moreover, the adhocracy culture has an external orientation that facilitates the conversion of tacit to explicit knowledge and the hierarchy culture, enforcing processes and procedures, supports the application of knowledge to practical situations and this knowledge is the basis for the development and modification of processes and procedures, converting explicit knowledge to implicit knowledge (p.599). These findings are important for this chapter as the possibility presents itself for a range of subcultures to exist in the organisation each with its own focus on a particular aspect of knowledge sharing.

## **SUBCULTURES AND KNOWLEDGE MANAGEMENT**

Subcultures emerge based on commonalities within the group, such as age, location, gender, and occupation (Parker, 2000). Sackmann (1992) took a knowledge-based view of culture and referred to subcultures as a collective cultural cognition or cultural knowledge that was held by various groups in

organisations. There are four types: dictionary knowledge (descriptions, expressions and definitions used in the organisation, i.e., the meanings); directory knowledge (commonly held practices and describes how things should be done); recipe knowledge (recommendations and what should be done); and axiomatic knowledge, which provides reasons and explanations.

In their analysis of a police subculture, Vuković (2020) found that the profession itself can impact upon the types of knowledge, as it was found that a combination of tacit and explicit knowledge was needed for achieving efficiency. More importantly, the police subculture was seen as an obstacle to knowledge that was only overcome through quality social relations and cooperation. Losonci et al.(2017) found a weak correlation between lean management practices and shop floor subcultures and put forward a need for either tailoring lean management transitions to each shop-floor subculture or pushing for a single homogenous culture, i.e., either multiculturalism through the acceptance and management of heterogeneous subcultures or uniculturalism through attempts to harmonize values, norms and perceptions of existing subcultures. In contrast, knowledge sharing and transfer within subcultures seems commonplace, especially where the subculture has emerged based upon directory and recipe knowledge, such as in the case of craft beer consumption subcultures (Koch & Sauerbronn, 2019).

A number of studies have highlighted how knowledge sharing may be impeded by subcultures due to strong social identities and in-group partiality (Ashforth & Mael, 1989; Brewer, 1979; Messick & Mackie, 1989), which may confirm findings that subcultures prefer to share knowledge within subcultures but not beyond them. Becher and Trowler (1989) referred to such contexts as subcultures being tribes protecting their territories.

In sum, the literature indicates that subcultures may present boundaries to knowledge sharing and transfer between subcultures but, on the other hand, subcultures are active in knowledge sharing within the subcultures themselves. Moreover, subcultures are able to have an impact upon the implementation of managerial decisions, be they in the realm of knowledge management, sustainable manufacturing or lean management practices (e.g., Copuš et al., 2019).

## **AN EMPIRICAL STUDY**

An empirical explorative study was undertaken to uncover the nature of subcultures and consider existing knowledge management models in light of the subcultures found. In this way, a model would be put forward for how practitioners could overcome subcultural obstacles to knowledge management through an ‘auditing of subcultures,’ and potential paths for future research could be suggested.

## **Methodology**

The study involves a large complex organisation in higher education. The organisation culture was assessed using the Organisational Culture Assessment Instrument (OCAI), which is based on the Competing Values Framework (CVF) (Cameron & Quinn, 2011). In this model, there are four culture types: clan (internal focus and operates with flexibility and discretion); adhocracy (external focus and operates with flexibility and discretion); market (external focus and operates with stability and control); and hierarchy (internal focus and operates with stability and control). This instrument was chosen in many studies to investigate the relationship between knowledge management and organisational culture, as referred to in the previous section.

Unlike most cultural assessment models, OCAI assumes that all four culture types exist simultaneously within the organisation, but that one may emerge as more dominant than the others. This dominance is reflected in the scores attributed to the four types across six dimensions (dominant characteristics, organisational leadership, management of employees, organisation glue, strategic emphasis and criteria of success). The model has already been used in a similar organisation (Gaál et al., 2010).

To identify subcultures, a method was employed previously used by Hofstede (1998) whereby a hierarchical cluster analysis was undertaken using Ward’s method. The method identifies potential clusters of subcultures and then the number of clusters is determined by scree analysis using a dendrogram (tree diagram).

## Findings

For the purposes of this chapter, the focus will move beyond the response rates and distribution of demographics for the sample and hone in on the subcultures found. In this way, the impact upon knowledge management can be considered and a model can be put forward for practitioners and further research based upon these findings. The same method was employed in two phases with the second phase occurring 5 years after the first, for comparison of the subculture composition:

*Table 1. Subcultures identified in the first phase*

Dominant characteristic	Subculture				
	1	2	3	4	5
Size (number of persons)	140	84	34	30	44
Dominant culture type	Market	Clan	Hierarchy	Strong Hierarchy	Strong Clan
Perceived organisational dominant culture type	Hierarchy	Hierarchy	Hierarchy	Hierarchy	Clan

Source: own construction

As can be seen in tables one and two, there are some consistencies in the larger subcultures, and some change in the smaller subculture over time. Most notably, two new subcultures have emerged: the

*Table 2. Subcultures identified in the second phase (5 years later)*

Dominant characteristic	Subculture					
	1	2	3	4	5	6
Size (number of persons)	144	62	61	24	36	21
Dominant culture type	Market	Clan	Hierarchy	Clan	Adhocracy	Market / Hierarchy
Perceived culture of the organisation as a whole	Hierarchy	Hierarchy	Hierarchy	Clan	Hierarchy	Hierarchy

Source: own construction

adhocracy and a subculture with two dominant types: the market / hierarchy subculture (with a common value of operating under stability and control).

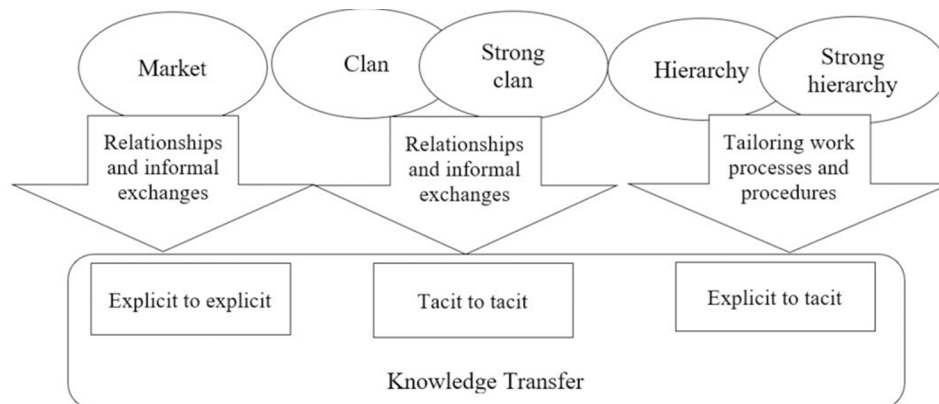
Moreover, boundaries were found between subcultures of similar type that were distinguished by their strength of values. It can also be seen in these tables that perceptions of the organisation across subcultures are in greater harmony than the values ascribed to the subcultures themselves.

The following section will consider the implications of these findings in line with the theme of this chapter and suggest a model for coping with subcultures in organisations practicing knowledge management.

## **SOLUTIONS AND RECOMMENDATIONS**

According to the literature, each culture type has a certain focus with regard to knowledge sharing which raised the possibility of diverse subcultures being distinguished not only in their values and perceptions but also in their areas of focus for knowledge sharing (e.g., Gray & Densten, 2005). The following figure illustrates the application of our findings for the first phase in light of the findings in the theoretical literature:

*Figure 1. Subcultures from phase 1 and their potential for knowledge sharing and transfer*



As can be seen in figure 1, the potential for knowledge transfer increases due to a wide range of conversions of knowledge brought about by diverse subcultures. In a homogenous culture, like a clan culture type, tacit to tacit knowledge may be converted (Gray & Densten, 2005), but the culture appears lacking in other aspects of knowledge transfer due to using purely a socialization and collaboration process for knowledge transfer. In contrast, the presence of different subculture types offers different processes for achieving knowledge transfer based upon the characteristics specific to each subculture. From our findings, it could also be said that a lack of an adhocracy culture type may result in a lack of externalization as a knowledge process, which also limits the conversion of tacit to explicit knowledge. In sum, the existence of subcultures may be seen as boundaries to cross-subcultural knowledge exchange, but the diversity itself seems a strength as subcultures work together to facilitate knowledge transfer, with each having its own specialization.

The findings also highlight how perceptions vary across subcultures. From a knowledge perspective this may be an indicator of how knowledge is perceived as managed in the organisation. In both tables one and table two, it can be seen that the hierarchical culture is perceived by most subcultures as characteristic of the organisation. The literature also finds that the hierarchical culture is based upon tailoring work processes and procedures, which act as an internalization knowledge process, converting explicit to tacit knowledge. Thus, logically, it seems that subcultures may perceive this knowledge process as dominant or preferred in the organisation. If this notion is further considered, then subcultures may indeed perceive themselves as counter cultures in that they opt for their own knowledge process, which suits the values and norms of that subculture, rather than follow the ‘company line’. However, as mentioned, this diversity of approaches may in fact be to the benefit of the organisation’s knowledge management.

Through the analysis of the literature and the use of an empirical study, it has been found that the complexity embodied in the emergence of subcultures in large complex organisations is further complicated by the apparent dynamic nature of subcultures as they change over time. The literature also found that knowledge management is critical to the success of organisations, but that there are barriers in cross-subculture knowledge sharing and transfer despite increased knowledge transfer and sharing within subcultures themselves.

*Figure 2. The process for knowledge management across subcultures*

*Source: Own construction*



Based on the literature and the empirical findings, this model presents a possibility for knowledge management in large complex organisations, with subcultures. Knowledge management requires the willingness and ability of employees to share and transfer knowledge. However, it was found that subcultures have distinct boundaries between themselves and other subcultures. Overcoming these boundaries will require greater cross-subculture cooperation. As there is no guarantee, according to the literature, that subcultures form around formal divisions in the organisational structure (e.g., sections, departments, divisions, business units) the subcultures need to be identified with an organisational culture assessment instrument, such as the OCAI used in this study. Then, a cluster analysis performed. Cooperation between subcultures may be preceded by a representative of each subculture establishing a ‘cross-subcultural team’ where these representatives should act as ambassadors or change agents (Johnson-Cramer et al., 2007), to promote knowledge sharing and transfer across the rest of the organisation. In step 3 the use of projects could be used to encourage sharing and transferring knowledge, such as those practices covered in the literature, i.e., initiating lean management practices, quality control, or projects to practice greater sustainability. As with most change models, some form of reinforcement is required to ensure subcultures do not revert back to their old ways. This could take the form of bonuses for achieving cross-subcultural projects, knowledge transfer and sharing having a place in performance appraisals, and highlighting short-term gains (individual, group and organisational) from cross-cultural knowledge sharing and transfer.

The emergence of the adhocracy culture is an interesting result in relation to the literature as this culture type was referred to by researchers as demonstrating a symbiotic relationship between knowledge management and organisational culture (e.g., Gray & Densten, 2005). In the organisation at the heart of the empirical study, there were indeed some pushes by top management towards greater research and development during the two phases, which was reinforced with reward management and performance appraisals including these aspects, as well as repeated in newsletters and on the organisation's website. However, this relationship was not a focus of the study and there is no way to detect causality, although it certainly provides for an interesting future research direction.

This chapter focussed upon how subcultures may affect knowledge management. However, if successful knowledge management depends on the organisational culture in the context of innovation (Taleghani & Talebian, 2013) combined with the fact that cultural models indicate a type that is more inclined to towards innovation and creativity, then there is a potential for members of an adhocracy culture to promote knowledge management initiatives as 'cultural ambassadors' or change champions (Johnson-Cramer et al., 2007), but on a subcultural level.

As a final note, management may consider other possible solutions for encouraging subcultures to share information, such as introducing an enterprise search engine that covers all domains of all subcultures, or widescale enrolment in company policies and procedures. The focus of this chapter has been on how amenable subcultures are to knowledge sharing in large organisation. Although there have been few studies of knowledge management on the subcultural level, the effect of subcultures on knowledge management seems somewhat reminiscent of the Bank Wiring Rooms in the Hawthorne studies (Mayo, 1933; 1945), where subcultural norms inhibited productivity despite management initiatives. In sum, regardless of knowledge management policies and procedures that may be introduced, informal subcultures may form cultural barriers which may support policies and procedures (enhancing subcultures), be an obstacle to them (counter subcultures), or be somewhere in between (orthogonal subculture). The empirical study highlighted in this chapter presents a more positive note in this respect as a mix of heterogeneous subcultures may indicate a proclivity of subcultures towards certain knowledge transfer processes and types of knowledge conversion. Thus, the chapter is a look at subcultural responses to initiatives, rather than the initiatives themselves. This does not negate the need and usefulness of such initiatives, but highlights the need to consider subcultural perceptions, norms and values when introducing them.

The study also comes with an important caution. It has been found that subcultures are dynamic and change over time. Whilst change is not extreme, the process suggested here requires a regular reassessment and, if necessary, adjustment to allow for the emergence of new subcultures and the disbanding of others.

## **FUTURE RESEARCH DIRECTIONS**

The model put forward in the study is intended to aid practitioners in implementing a knowledge management strategy in large complex organisations. In this section, some potential research directions are proposed for researchers as well.

The study uncovered that diverse subcultures, whether they see themselves as a counter subculture or not, may be a benefit to the organisation as they offer a variety of knowledge management processes and conversions of different types of knowledge. However, this potential benefit needs further study to confirm if the theoretical model presented here stands. Moreover, the study only covers one institution in the higher education sector. As subcultures have been identified in large complex organisations in a

range of sectors, according to the literature, there is certainly scope for comparing the effects of subcultures on knowledge management in different contexts.

A quantitative method was used in this study and yielded useful results. However, a qualitative method or mixed method approach may deepen our understanding of the role of subcultures in knowledge sharing and transfer in large complex organisations, as well as offer the possibility to identify subcultures by other means.

The empirical study of this chapter was conducted in Central Europe, which even as a region has a diverse range of societal and cultural attitudes. Considering the link between national culture and organisational culture, future research along the same lines as this study but in different countries can offer a possibility to extend this study through investigating other regions of the world with different sets of values, attitudes and behaviours. This does not neglect the findings of this current study, as it can be seen in this chapter that the study provides important insights into the potential link between knowledge management and organisational subcultures, as well as the associated effects of subcultures in large organisations practicing knowledge management.

It was found in the literature that there is a symbiotic relationship between knowledge management and organisational culture, such as when an organisation pushes for the creation of ideas and sharing thereof, then there is a greater propensity for an adhocratic culture to emerge and/or expand. In the author's empirical study, it was found that over a period of 5 years, two new subcultures had emerged, the adhocracy and the market-hierarchy culture. Although there is no way to tell if these subcultures emerged as a result of specific pushes by management towards knowledge management practices such as for greater creativity and innovation, the symbiotic relationship has not been covered in the literature to the author's knowledge and there is certainly potential for exploring this topic further both as a means of expanding upon current theory and for providing ways forward for practitioners.

## **CONCLUSION**

This chapter has introduced the background theory and literature on the impact of subcultures on knowledge management in large complex organisations. With the additional aid of an empirical study, a model has been suggested as a means of dealing with the evident boundaries between subcultures in these organisations.

The study highlights a warning for practitioners and researchers alike, that both values and perceptions vary across organisations, making the assumption that large organisations have a single homogenous culture type a potentially hazardous one when attempting to implement a knowledge management strategy. At best it may present the average of values and perceptions across subcultures, at worst, if not dealt with, then the boundaries between subcultures may be raised higher if their values and perceptions are challenged rather than considered, damaging the productivity and efficiency, and ultimately the success of large organisations.

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## KEY TERMS AND DEFINITIONS

**Adhocracy Culture:** A type of organisational culture with value placed upon flexibility, innovation, and creativity, with a focus placed on one or more externalities such as the customer, market, technology, etc.

**Clan Culture:** A type of organisational culture with value placed upon collaboration, teamwork and flexibility, with a focus towards the internal workings of organisations.

**Fragmentation Perspective:** The view held that an organisational culture is highly individualistic, with no groups sharing values, norms, and perceptions.

**Heterogeneous:** Diverse, varied, dissimilar, e.g., different subculture existing in a single organisation.

**Hierarchy Culture:** A type of organisational culture with value stability and control, with a focus placed on what happens within the firm in general, and rules and procedures in particular.

**Homogenous:** All the same, e.g., a single unified culture with all employees sharing the same values, norms, and perceptions.

**Market Culture:** A type of organisational culture with value placed upon results, control and a competitive instinct, with a focus placed on one or more externalities such as the customer, market, technology, etc.

**Pluralist Perspective:** The view held that organisations have diverse subcultures.

**Subcultures:** A group that has its own set of values, norms and perceptions that distinguishes itself from other groups.

**Unitarist Perspective:** The view held that organisations have a single culture with all employees sharing the same values.

# Section 2

# Process

# Chapter 8

## Effective Knowledge Sharing: A Guide to the Key Enablers and Inhibitors

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### ABSTRACT

*This chapter explores the enablers and inhibitors to effective knowledge sharing practices within different contexts and fields of work. It covers the benefits of knowledge sharing and explores some of the most commonly used methods referencing the experiences within the banking and financial sector, the higher education sector, the automotive industry, and within the field of community development. Reference is also made to the experiences of knowledge sharing in light of the COVID-19 pandemic. The chapter concludes by asserting that a ‘one size fits all’ approach to knowledge sharing and knowledge management is not feasible, but argues that there is equally strong evidence to support the view that knowledge sharing should be a key priority for all organizations in order for them to be sustainable and relevant in the longer term.*

### INTRODUCTION

This chapter aims to explore the enablers and inhibitors to effective knowledge sharing practices within different contexts and fields of work. It draws on evidence demonstrated in the current literature as to what factors support and promote effective knowledge sharing amongst individuals and teams within a single organizational entity and also between different organizations when working collaboratively or even competitively. It also examines and explains the potential inhibitors that exist in relation to knowledge sharing and explores the possible reasons and rationale for this, alongside highlighting a range of strategies used by different organizations that could be utilized to counteract such barriers.

Within the chapter, there is a focus on knowledge sharing experiences within a range of different sectors and industries, highlighting the commonalities between them, but also the distinct challenges that each face in leveraging the collective knowledge of their workforces and of others to gain competitive advantage in their field. This includes the automotive, aerospace, banking and finance, and higher

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education sectors. The chapter also draws on the experiences of knowledge sharing in light of the COVID-19 pandemic and investigates knowledge sharing practices in the management of this worldwide crisis, with the aim of identifying the lessons that can be learned for future generations in relation to knowledge sharing on such a large and unprecedented scale

Ultimately, this chapter aims to provide a thought-provoking yet practical guide to better understanding how knowledge sharing practices can be encouraged and supported in different contexts and situations, how they interact with organizational culture and other factors, and the steps that can be taken to address any barriers which may exist to improve individual or collective organizational performance.

## **BACKGROUND**

This section of the chapter provides a critical review of the key literature surrounding the issue of knowledge sharing, including exploring the definitions of knowledge sharing, the potential benefits, knowledge flows, and different methods that can be used to share knowledge.

### **Benefits of Knowledge Sharing**

Knowledge sharing is a costly and intangible resource but one which can notably increase an organization's competitiveness in the market. Knowledge sharing plays a critical role in job performance by facilitating the efficient distribution of knowledge and increased productivity (Huie et al., 2020). Janus (2016) argues that a knowledge sharing organization views knowledge as a significant currency and values its operational experiences as opportunities for learning both internally through its employees and its external partners and stakeholders. Knowledge sharing is widely considered to represent an important component of knowledge management and a key determinant of its success (Ramjeawon & Rowley, 2017). Indeed, Nazim and Mukherjee (2016) argue that knowledge sharing is the single most important factor in the overall success of knowledge management.

### **Definitions of Knowledge Sharing**

As a concept, knowledge sharing has been defined in many different ways. According to Ahmad (2017), knowledge sharing can be described as the exchange of task-related information, advice, and expertise to help others in carrying out daily tasks, solving problems, and developing new ideas. Abd-Mutalib et al. (2020) define knowledge sharing as a 'social interaction culture,' which involves exchanging knowledge, experiences, and skills throughout a department or organization. McAdam, Moffett, and Peng (2012) describe it more simply as the process of creating and exchanging information amongst individuals, groups, and organizations. Le and Lei (2019) refer to knowledge sharing as a process of interchanging knowledge and experience amongst individuals, which helps equip them with valuable knowledge and skills to achieve personal and organizational goals. In practice, it is a method for transitioning knowledge from one part of a business to another and can be viewed as both a theory and a practice.

While the term 'knowledge sharing' has been used synonymously with 'knowledge exchange,' the term is often differentiated from 'knowledge transfer.' According to Zheng (2017), knowledge transfer describes the moving and flow of knowledge between different areas, departments, and organizations rather than the more individualistic exchange of knowledge sharing. In the view of Tangaraja et al.



## **Effective Knowledge Sharing**

(2016), knowledge sharing is a subset of knowledge transfer which they claim is a broader concept than knowledge sharing. However, they also propose that knowledge sharing is not one of the immediate processes involved in knowledge transfer and that the processes involved in each differ according to the strategy used and the chosen perspective.

As a process, knowledge sharing is multi-directional in that it involves both the donation and the collection of knowledge. Akram et al. (2020) describe knowledge donating as the communication which occurs when a person wishes to transfer their own intellectual capital onto another, whereas knowledge collecting is described as the effort to persuade others to share their intellectual capital.

Despite knowledge sharing being almost ubiquitously promoted in modern organizations, the hiding of knowledge is still prevalent (Su, 2020). Sharing knowledge is a discretionary act, and some people may see benefits in keeping their knowledge to themselves (Gerpott et al., 2020). There may be a reluctance to share knowledge if it is felt that what is to be given away is more than what is there to be gained. In highly competitive environments, individuals may be disinclined to share information if there is a perceived threat to competitive advantage, status, or power (Nguyen et al., 2019). Therefore, a key challenge is to understand what knowledge can be shared and in what form to sustain a relationship or a project without losing a key source of competitive advantage (Bertoni et al., 2011). However, it could also be argued that instead of losing or giving competitive advantage away, knowledge sharing can be perceived as a creative activity through which all parties can benefit.

## **Knowledge Flows**

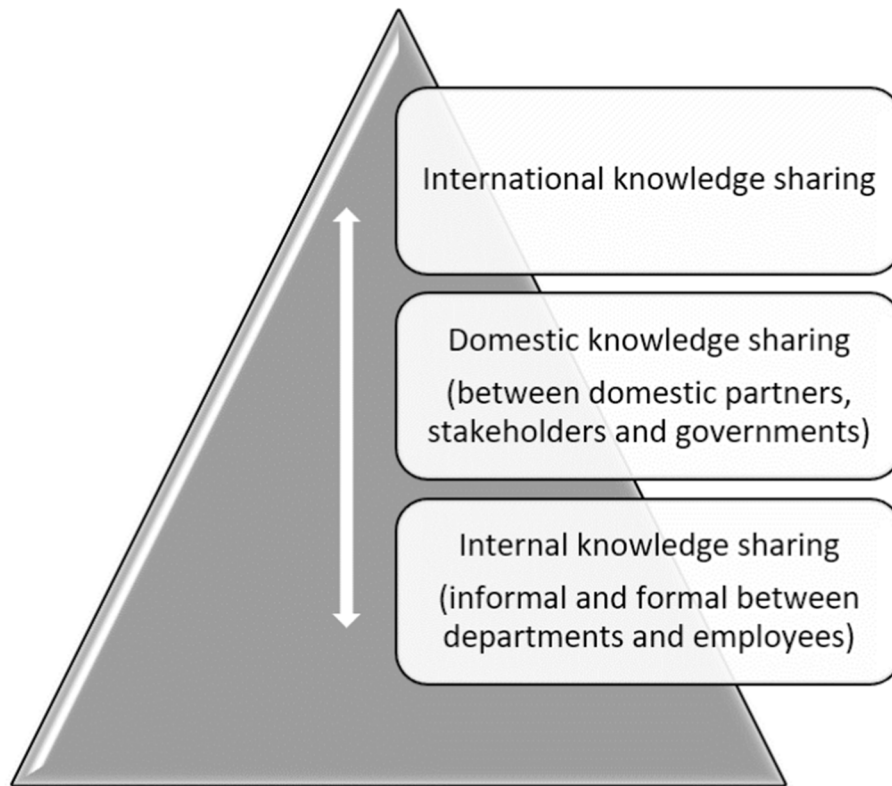
Many organizations are concerned only with knowledge sharing processes and practices between their own departments and units; however, increasing globalization means that more organizations seek to share knowledge on a wider scale either with other organizations in the same country and/or those which operate in other countries. In order to be successful, such organizations need to think carefully about how knowledge can flow more effectively between themselves and their external partners, and targeted approaches for each level of knowledge sharing (internal, domestic, and international) must be tailored and applied as appropriate. Figure 1 summarises the flow of knowledge sharing spanning internal sharing of knowledge between individuals and departments, to international knowledge sharing.

## **Domestic and International Knowledge Sharing Methods**

According to the Knowledge Sharing Alliance (OECD, 2014), there are a number of proven knowledge sharing practices that can be adopted for sharing knowledge on an international scale. These include peer learning and learning loops. They define peer learning as a two-way, reciprocal learning activity that should be mutually beneficial and involve the sharing of knowledge, ideas, and experience between participants (often from different regions or countries). They suggest that peer learning is an evolutionary approach that incorporates five key elements, including: facilitating knowledge-intensive activities whereby peers learn from each other; ensuring an equal footing between those who are visiting and those who are hosting the peer learning process; the agreement of a specific topic or policy area to discuss, with all participants bringing their own knowledge and expertise to the table; having an openness to learning and sharing knowledge; and a commitment to continuous knowledge exchange.

The Alliance describes learning loops as an essential instrument for joint learning. They involve a continuous dialogue with stakeholders in a country or region, and it is claimed that their main advantage

*Figure 1. The flow of knowledge sharing (from internal knowledge sharing to external international knowledge sharing)  
(Adapted from Janus, 2016)*



is that they take into account the implementation component of policies through cooperation with local partners on the ground. Within learning loops, the Alliance suggests that communication flows can be achieved through focal points at each level of learning: country, organization, and inter-agency levels.

A range of other international knowledge sharing platforms exists, including to share knowledge, research and learning. Online international journals, alliances, communities of practice, conferences, commissions, and so forth all provide opportunities for knowledge sharing on a broader scale. However, the risk of losing competitive advantage is a major inhibitor in fully exploiting the creative potential inherent in international knowledge sharing.

### **Organizational Level Knowledge Sharing Methods**

At an organizational level, knowledge is shared in many different ways. Knowledge sharing within organizations can help them understand ways to strengthen relationships and networks, which can lead to lessons being shared on a wider scale, driving efficiency, upskilling the workforce, and unlocking new opportunities to deliver internal collaboration, diversification, and development.

## ***Effective Knowledge Sharing***

A range of methods have been identified as facilitating effective knowledge sharing at a departmental and organizational level. A ‘one size fits all’ approach is clearly not going to work as so many different internal and external factors impact the effectiveness of different methods. Table 1 provides a summary of some of the most commonly cited methods of knowledge sharing:

## **ENABLERS AND INHIBITORS OF KNOWLEDGE SHARING**

### **Enablers of Knowledge Sharing**

There are many enablers to effective knowledge sharing practices within and between organizations, teams, and individuals. According to Janus (2016), the main enablers of effective knowledge sharing in organizations are having an enabling environment and the existence and continued development of technical skills. They explain that the ‘enabling environment’ is created through the organization’s strategic management decisions and comprises of organizational culture and strong leadership, which is embedded in everyday operations and enables knowledge sharing. It is also an environment that acknowledges and rewards knowledge sharing, which is supported by effective governance mechanisms, appropriate financing, and both domestic and international partnerships. The technical skills that need to exist are those which can systematically operationalize successful knowledge capture and sharing, transforming them into learning and knowledge products, effectively sharing them internally and externally, and monitoring and evaluating their impact. These enablers are illustrated in Figure 2:

### **Organizational Culture and Leadership**

The culture of an organization is comprised of a complex interplay of many factors, including the organization’s structure, leadership style, history, financial position, the external environment, and its espoused mission and values. Organizations that embrace the principles of transparency, communication, and collaboration will find it easier to adopt knowledge sharing procedures and technology because their employees are already accustomed to transferring knowledge between individuals and are more likely to have a willingness to collaborate and help each other.

An organizational culture that supports effective knowledge sharing is one that promotes and cultivates the attitudes and beliefs that motivate and encourage employees to actively engage in communication, translation, conversion, and filtering to make knowledge available and accessible throughout the organization (Intezari et al., 2017).

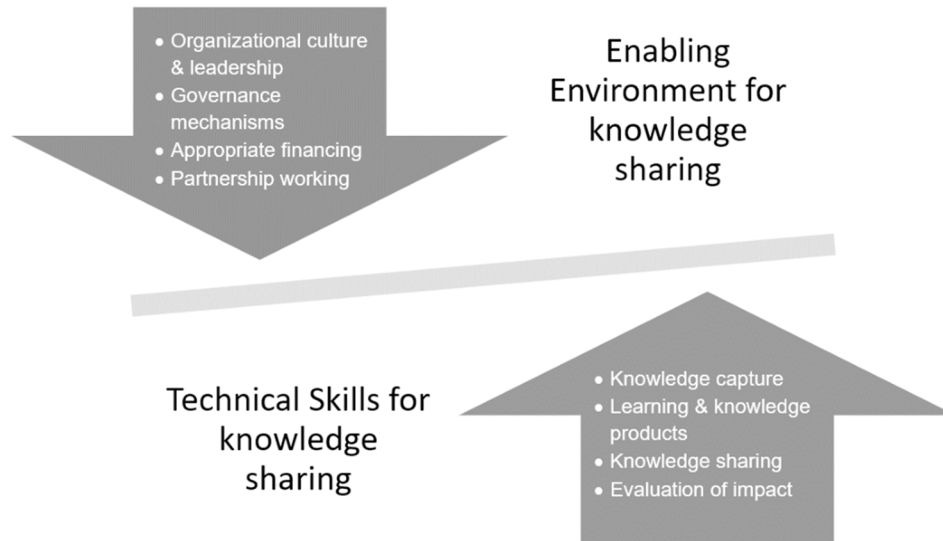
Knowledge sharing begins at the top, and senior managers play a crucial role in designing, implementing, and scaling up the organization’s knowledge sharing strategy. Leadership characteristics have a considerable influence on either promoting or restricting employees’ knowledge sharing behaviours. As role models, senior managers need to clearly convey the importance of knowledge sharing in their words and actions. Some studies have particularly advocated the adoption of transformational styles of leadership in positively impacting an organization’s knowledge sharing climate and behaviour (Park & Kim, 2018; Le & Lei, 2019; Zhang et al., 2019).

Table 1. Frequently cited methods of inter-departmental or organizational methods of knowledge sharing

Knowledge Sharing Method	Key Features
Peer Assist	Peer Assist is a tool that supports 'learning before doing' processes. It is based on the premise that, for any given activity, another person will have done something that is at least broadly similar. Often takes the form of regular, coordinated group study sessions. The sessions create a less formal, "safe" learning environment for peers to support and learn from each other and together. Most commonly used in higher education settings.
After-Action Review	An After-Action Review is, in essence, a process of structured review or de-brief for analyzing what happened in a given situation or event, why it happened, and how it can be done better in the future. As a tool, After-Action Reviews can convert unconscious learning into tacit learning and can help build trust amongst team members and overcome the fear of making or admitting to mistakes.
Storytelling	Storytelling involves using narrative to share knowledge and understanding. It can be a powerful tool used to convey vision, pass on knowledge and wisdom, and to shape organizational culture. Stories are told with context and, like a traditional story, have a beginning, middle, and end. Establishing the appropriate setting is often an important aspect of eliciting knowledge sharing stories.
Mentoring	Mentoring is often described as one of the most effective ways of passing down tacit knowledge from an expert or specialist to someone with less experience. In essence, mentoring is about learning and sharing knowledge under the guidance of an expert and can be formal or informal. Enablers of mentoring include mentor availability and expertise, mutuality and responsiveness, and supportive relationships. Inhibitors, however, can include inappropriate matches, time constraints, power hierarchies, mentor accessibility, a lack of institutional support, and performance expectations.
Coaching	Coaching has been described as a longitudinal professional relationship that exists between an expert coach and a trainee and one which focuses on the mastery of a clearly defined, measurable, and achievable skill. It differs from mentoring in that it is much more structured and focuses on specific objectives within a set period of time.
Action Learning Sets	Action Learning Sets are structured mechanisms for working in small groups to tackle complicated issues. The sets are typically made up of between six and eight people who meet together regularly over a defined time period to collectively share knowledge and work on problems faced in ongoing practice. Sets are often multidisciplinary and comprise members from a range of organizations. Some virtual action learning may take place if organizations are geographically dispersed.
Communities of Practice	Communities of Practice are networks of practitioners within or across organizations who support each other to perform better through sharing their knowledge. They are informal, with self-selected participants setting their own agendas and establishing their own leadership. Organizations often use Communities of Practice to share knowledge thematically across traditional silos and teams.
Meetings, Forums, Video Conferencing	Meetings (in a range of forms) are commonly used in organizations for knowledge sharing and transfer. Essentially, a meeting or forum assembles people for a particular purpose and can take many forms but are generally characterized by location, ground rules, and norms for information and knowledge exchange. The COVID-19 pandemic has radically changed how organizations conduct meetings leading to the use of technology such as Video Conferencing to host meetings virtually through easily accessible applications such as MS Teams and Zoom. The benefits of moving meetings online have been evident in terms of saving participants' time and reducing their carbon emissions. Furthermore, there is the facility to record such meetings and thereby transfer the content into explicit knowledge, which can be used for later search and sharing purposes. However, some critics have identified that they inhibit the learning that face-to-face contact can bring in terms of knowledge sharing.
Workshops, Training, and Seminars	Workshops, training courses, and seminars are a more traditional approach to knowledge sharing frequently used in organizations. They may take a number of forms, including face-to-face courses (such as instructor-led / classroom type courses) and online programs. Most sessions of this type primarily focus on the transfer of explicit knowledge. Explicit knowledge is easily processed, organized, and communicated but does not necessarily reflect how to apply this knowledge. More recently, it has been identified that the process of taking employees out of the workplace, making them attend a course, then putting them back into the workplace is dysfunctional. Therefore, any courses must be designed to ensure that the participant can put that learning into practice and collaborate with others, including the sharing of implicit knowledge.
Knowledge Fairs	Knowledge fairs are events whereby participants have the opportunity to meet face-to-face with their partners and the public to share their knowledge and undertakings. They provide an opportunity for people to interact with each other and display and view best practice examples of work and practice. They also have the potential of stimulating future collaborations around knowledge creation and sharing. However, they can be timely and resource-intensive to organize and deliver.
Expertise Locator Systems	Expertise Locator Systems are basically knowledge repositories that aim to organize knowledge to make it more easily accessible by identifying experts who possess specific knowledge. This may take the form of directories, online databases, skills catalogues, and so forth. However, major limitations of traditional expertise locator systems have been identified, namely the need to keep their information up to date and the need for authority metrics to ensure reliability and quality.
Intranets and extranets	Knowledge sharing can be supported by using information and communication technology, for example, online databases, data warehousing, intranets, and extranets. While an intranet is an internal network where employees can create content, communicate and collaborate, an extranet is extended to include access to the organization's external network, including partners, suppliers, and so forth. It provides a shared network with limited, controlled access to organizational information and knowledge resources. Again, a limitation in relation to knowledge sharing is that these platforms need to be managed and kept up to date. The quality of knowledge sharing will depend on the quality of that administration.
Social media platforms	Social networks supported through an increasing selection of social media platforms can be a powerful source of knowledge sharing. A highly and specifically targeted network can facilitate access to relevant knowledge, connections, and advice for its members. In the context of business, knowledge sharing to networks via social media enables organizations to have a significantly closer relationship with current and potential customers and other stakeholders.

## Effective Knowledge Sharing

Figure 2. Enablers of knowledge sharing



## Governance Mechanisms

Good governance of knowledge sharing occurs when the right balance between people, core work processes, and technology is achieved. Governance mechanisms ensure the alignment between the business strategy and knowledge resources and processes (Sanz & Ortiz-Marcos, 2019). Roles and responsibilities around knowledge sharing need to be clearly defined, and the requirement to share knowledge needs to be embedded in the organizational culture with all individual employees and departments participating (Jen et al., 2020).

Formal governance mechanisms include reward systems, work design, performance monitoring, information systems, standard operating procedures, and organizational structure. Such knowledge governance allows organizations to use organizational design and material incentives to govern the behaviour of knowledge sharing (Zhao et al., 2017). Informal governance mechanisms include the beliefs, values, and shared norms of those working in the organization (Huang et al., 2013). According to Abbasi and Dastgeer (2018), informal mechanisms can generate a synergistic effect by allowing employees an opportunity to meet up and discuss issues, share knowledge, and find new solutions. They argue that such opportunities reflect a form of social exchange that supports mutual trust and allows individuals to share their knowledge more confidently. Social exchange theory suggests that both formal and informal knowledge governance mechanisms are required to facilitate a mutually valuable knowledge sharing process (Abbasi & Dastgeer, 2018).

Information systems and platforms can form part of the governance mechanisms an organization puts in place to support knowledge sharing; however, while such systems can help facilitate knowledge sharing, they are unlikely to drive it. Therefore, they need to align to an individual organization's context, and the knowledge sharing processes its employees and partners are able and willing to use.

Another form of governance mechanism comes in the form of skills development initiatives. To strengthen this aspect of knowledge sharing governance, training and induction programs within the organization should include a focus on enhancing knowledge sharing skills within the workforce, and knowledge sharing should be explicitly incorporated into job descriptions and the terms of reference of committees and groups.

## Appropriate Financing

Although the function of knowledge sharing itself is relatively low cost, its planning and implementation potentially involves significant costs, including, for example, costs associated with content development, technology support, facilitation, backfill, and travel. Therefore, a dedicated budget for knowledge and learning is often advised and provides an important signal that knowledge sharing is a priority for an organization (Oliveira et al., 2017). Sources of funding may include the central budget, external grants, and funding sought through partnerships.

## Partnership Working

In the increasingly complex environment in which many organizations operate, domestic and international partnerships are becoming an integral component of knowledge management systems and knowledge sharing practices. The benefits of partnerships in relation to knowledge sharing include having access to a wider skills and expertise base, increasing capacity through strengthening technical performance and competence, and the likelihood of innovation is enhanced as employees involved in partnership working are exposed to new ideas and techniques. Collaborations through partnerships can also support organizations to be more flexible and responsive, and this often means that new channels of financing knowledge sharing and innovation are opened up.

## Knowledge Capture

Knowledge capture falls under the technical enablers for knowledge sharing and can be described as a process whereby knowledge that inhabits the mind of an individual can be converted into an explicit representation. Through the systematic capture of knowledge and expertise, organizations can continually improve their performance, accelerate decision making, and retain critical knowledge. Having effective knowledge capture mechanisms and technologies that can support knowledge sharing benefits organizations by acting as a precursor of employee learning, flexibility and adaptability, high levels of job satisfaction, and reduced intention to leave. In order to capture knowledge effectively, employees at all levels in the organization need the technical skills to do this, and validation mechanisms need to be in place to systematically review the quality of the captured knowledge.

## Learning and Knowledge Products

Learning and knowledge products are core indicators of an organization's intellectual capital (Zubr, 2018). Examples of knowledge products include training material, performance reports, statistics, articles in journals, books, software, legal documents, art, and so forth. Knowledge products have been defined as those products which provide both data and information to facilitate the interpretation and use of that

## ***Effective Knowledge Sharing***

data to add value (Good et al., 2017). Knowledge products must be easily accessible to serve immediate operational needs but need to be tailored to accommodate the workforce's needs and preferred learning styles. They are a valuable training resource and act as an enabler for building knowledge sharing relationships with others.

## **Knowledge Sharing**

As a technical enabler, knowledge sharing can improve operations at all levels in an organization. When knowledge is effectively shared internally, it can promote collaboration and innovation amongst employees and departments and can maintain critical know-how. When shared domestically, knowledge can support local partners to solve shared problems and contribute towards policy development and implementation. On an international level, knowledge sharing can stimulate large-scale change and reform. Some of the most common methods of knowledge sharing have already been discussed earlier in this chapter and form key components in the technical skills required by organizations.

## **Evaluation of Impact**

Monitoring and evaluating the impact of knowledge sharing initiatives are essential if organizations are to understand if and how different initiatives are working and if adjustments are needed, or efforts re-focused. A systematic approach to monitoring and evaluating can help organizations continually improve their knowledge management systems. There is a range of quantitative and qualitative metrics that can be used to achieve this. Quantitative or 'hard' metrics may include the frequency of access, contribution, and use of the knowledge assets and knowledge sharing processes an organization may have established. Qualitative or 'soft' metrics may focus on employee or partner perceptions of these assets and processes and their ease of access.

## **Inhibitors of Knowledge Sharing**

There are two overarching types of barriers to effective knowledge sharing:

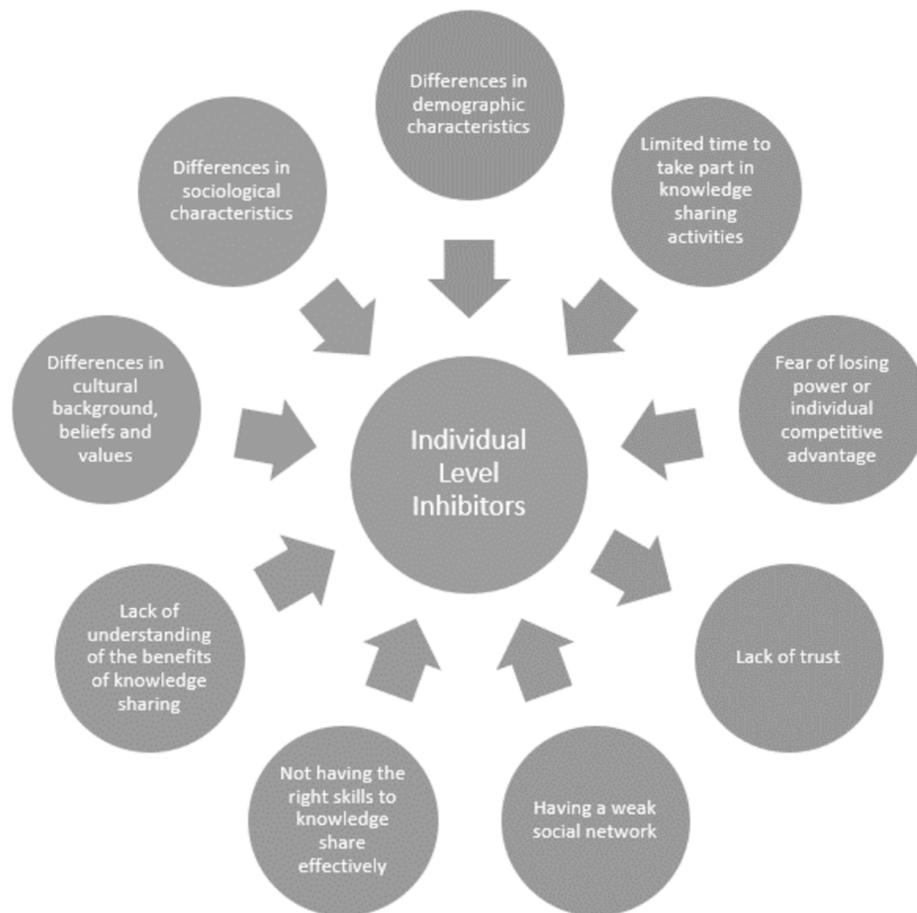
1. A lack of knowledge sharing systems in place — either there are no clear processes for how employees are supposed to share information or the agreed knowledge sharing methods and mechanisms are ineffective.
2. A lack of adoption of knowledge sharing systems — employees are either unaware of the knowledge sharing methods they are supposed to use, or they know about them but choose, for some reason, not to use them.

Inhibitors to effective knowledge sharing take place at an individual, organizational, and technological level.

### Individual-Level Inhibitors to Knowledge Sharing

At an individual level, barriers include factors such as a lack of trust, time, access to social networks, skills, and differences in characteristics such as age and educational achievement. A summary of some of the key inhibitors to knowledge sharing at an individual level is given in Figure 3:

Figure 3. Individual level inhibitors to knowledge sharing



Trust, in particular, features heavily in the literature, and there is a general consensus that trust is a critical feature of effective knowledge sharing (Han et al., 2020). It is widely accepted that knowledge flows best when there is mutual trust between people, and it is both an antecedent and a consequence of knowledge sharing (McNeish & Mann, 2010). Huie et al. (2020) argue that the development and sustaining of trust is essential for knowledge sharing, and when it is not there, it acts as a significant barrier. Trust is also a key feature of the willingness to share knowledge externally between one organization and another. The risks associated with sharing knowledge externally increase when combined with variable



## **Effective Knowledge Sharing**

government regulation and weak protection of intellectual property rights (Rungsithong & Meyer, 2020). These factors pertaining to specific business environments influence the extent to which organizations rely on social capital in their business relationships and their exchange of knowledge (Meyer & Peng, 2016). According to Olaisen and Revang (2018), formal intellectual property rights are key to building up and keeping trust in inter-organizational cooperation and collaboration in relation to knowledge sharing, while others argue that they can inhibit knowledge sharing (Sariola, 2021; Bruggemann et al., 2016).

### **Organizational-Level Inhibitors to Knowledge Sharing**

At an organizational level, inhibitors of effective knowledge sharing include a lack of vision and strategy, allocation of insufficient resources, having a hierarchical bureaucratic structure, and a culture that does not promote knowledge sharing. A summary of some of the key inhibitors to knowledge sharing at an organizational level is given in Figure 4:

### **Technological-Level Inhibitors to Knowledge Sharing**

At a technological level, inhibitors of effective knowledge sharing include a lack of information and communications technology (ICT) systems and platforms to share knowledge, underdeveloped technological skills in employees, and a mismatch between operations and ICT systems. A summary of some of the key inhibitors to knowledge sharing at a technological level is given in Figure 5:

### **National Culture**

A further dimension of knowledge sharing that needs to be taken into consideration is national culture. In relation to knowledge sharing, individuals from different countries and cultures often hold different views and perceptions of how, and if, this is done as a result of their cultural heritage (Tung & Baumann, 2009). Collectivistic countries such as China and Pakistan rely on informal knowledge sharing mechanisms, and individualistic cultures like the United States tend to be more comfortable with formal ones (Huang et al., 2013). In their study of knowledge sharing practices in Chinese service organizations, McAdam, Moffett, and Peng (2012) found that cultural influences had a significant impact and argued that the majority of knowledge management theory literature is based on western business environments and related assumptions.

They found that in a Chinese context, the prevailing group culture was the main vehicle for promoting knowledge sharing instead of the individualistic approaches preferred in other cultures. In contrast, in another study focussing on knowledge sharing in Jordan, Almarabeh (2011) found that the strong power culture which exists in many Arab organizations results in hierarchical and bureaucratic structures and patriarchal leadership, which in turn inhibits knowledge sharing practices. A further study comparing knowledge sharing preferences between Chinese and Brazilian automotive workers (Muniz Jr et al., 2019) found that while the Brazilian workers preferred training and better incentive schemes to help promote their knowledge sharing support mechanisms, the Chinese workers preferred greater standardization through structure and standard operating procedures. Therefore, it is evident that national culture needs to be a key consideration when developing strategies to improve knowledge sharing practices.

With ongoing globalization, organizations are significantly more culturally fragmented with employees that have insufficient shared language and information about perceptions and practices in other

Figure 4. Organizational level inhibitors to knowledge sharing



parts of the world. Such diversity makes the coordination of interdependent work of the multiple parties via knowledge sharing far more complicated as knowledge is something which is embedded in local work practices which give rise to local interpretations, making it more difficult for individuals to share knowledge across work boundaries (Trier et al., 2017). Language and time barriers also prevent effective knowledge sharing (Alkhazali et al., 2019).

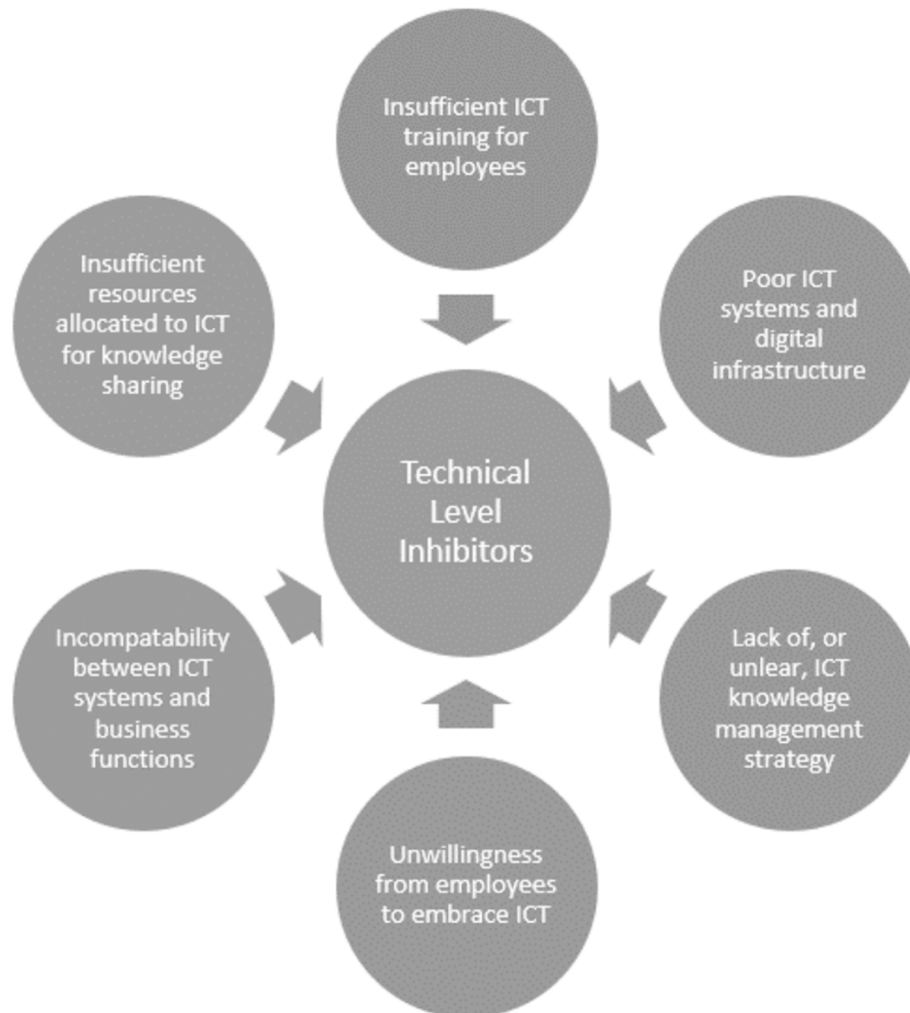
### Knowledge Sharing in Different Scenarios

There is no universal 'best practice' approach to knowledge sharing that can be applied to all sectors and industries as the knowledge sharing process is heavily mediated by context. However, knowledge sharing is an essential prerequisite of innovation, and so individual organizations, and collective sectors and industries, need to find suitable knowledge sharing practices that work for them.

When working collaboratively or across sectors, establishing mutually acceptable knowledge sharing practices is a key ingredient of project success and innovation (Alshawabkeh et al., 2020). This is a view shared by Crupi et al. (2020), who argue that organizations who adopt open forms of innovation are bet-

## Effective Knowledge Sharing

Figure 5. Technological level inhibitors to knowledge sharing



ter able to identify new forms of collaborations to detect, absorb, share and exploit external knowledge leading to them being able to commercialize valuable innovations by opening up boundaries. Indeed, in certain joint ventures and collaborations, knowledge sharing is mandatory.

### Knowledge Sharing within the Automotive Industry

From their study of knowledge sharing in the automotive industry, Muniz Jr et al. (2019) found that workers and managers perceived internalization as the most significant form of knowledge sharing between workers in the automotive context. They argue that in production scenarios, at a micro-level, the interaction between the knowledge sharer and the knowledge receiver can lead to reduced duplication, less 'down' time, and provide direction for the aspiring workers to transform into experts and problem solvers in the primary phase of production which in turn can save time, money, and labour.

Within the production context, examples of knowledge sharing practices frequently include on-the-job training of novice operators by a more experienced one, practical interactions among operators during the day-by-day activities, and the discussion of issues and potential solutions during continuous improvement (kaizen) events. Muniz Jr et al. (2019) found that within the automotive manufacturing plants in their study, the main factors positively associated with knowledge sharing was the existence of standard operating procedures, communication, and training. They explained that these factors are related to tacit knowledge socialization through dialogue, observation, and imitation between workers. Standard operating procedures were the main formal technical communication mechanism between managers and workers, with managers perceiving these procedures as an appropriate knowledge sharing route as they directly contributed to their preparation and approval. However, they found that while production workers were empowered to help solve problems and propose suggestions for incremental innovation, their autonomy in this process was still relatively low, contributing only ‘contextual’ and ‘conventional’ insight to the knowledge sharing process.

## Knowledge Sharing within the Aerospace Industry

Within the aerospace industry, the sector is dominated by a small number of global companies which operate within complex networks of global interdependency. This means that collaborative working and knowledge sharing is a commercial imperative while respecting constraints imposed on knowledge sharing across some national borders by regulations such as the International Traffic in Arms Regulations (ITAR) in the United States. The high technology content of this sector and its complex network of interdependency presents significant barriers to new entrants. Given the industry’s dependence on highly technical knowledge, a key risk is losing knowledge by losing experts either through a move to another role or organization or through the retirement of an expert.

Since the products of the aerospace industry are highly specialized engineered systems that are safety-critical, they require a level of knowledge diffusion and expertise accessibility throughout all stages of its product lifecycle, including the conceptualization of the design, the engineering and manufacturing processes, in the supply chain, and in relation to other industry specific needs.

The industry has responded to these challenges by enabling a more synchronized integration of manufacturing knowledge from both internal and supplier manufacturing systems (El Souri et al., 2019). ‘Knowledge Maps’ have been used in this sector to help improve knowledge sharing. They act as a visual aid to illustrate where knowledge can be found within an organization and how to identify and locate those who have the most expertise.

According to Mengqi and Weiguo (2019), within the aerospace industry, ‘Knowledge Maps’ can be used to improve knowledge sharing by: creating an internal information platform to build collaborative partner relationships to achieve competitive advantage; being applied to flight vehicle maintenance systems to assist in monitoring and controlling the maintenance status of flight vehicles and to address the problem of maintenance knowledge about a new system which is lacking or has been lost, and through managing aviation archives which are a valuable knowledge reference source.

## Knowledge Sharing within Banking and the Financial Sector

In the banking and financial sector, it is widely accepted that knowledge is power, and institutions within this sector are constantly looking for ways to leverage that knowledge and transform it into a competitive

## ***Effective Knowledge Sharing***

advantage. Banking is a very knowledge-intensive sector that relies heavily on the accrued knowledge and experiences of employees (Gangi et al., 2019). Within the banking context, Valipour et al. (2017) concluded that the exchange of employees' knowledge and skills was essential in identifying new ideas and creative solutions, which are critical for continually developing new and innovative financial products, processes, and technologies.

From their investigation into the link between knowledge sharing and innovation, Al Ahmad et al. (2020) found that a range of perspectives has been used to understand the association between the two within the banking environment. These include perspectives that emphasize the importance of the exchange of knowledge directly between employees to advance new developments and technologies and others that focus on more tangible forms of knowledge sharing through manuals, operating procedures, and models of practice.

Within the literature, reference is often made to the 'World Bank' and its transformation from being a lending institution into a knowledge leader in its field, and so, therefore, warrants specific reference. The organization claims that in order to move towards an optimal state of knowledge management, the World Bank has developed a knowledge management plan which sets out the pathway to creating a knowledge sharing 'ecosystem' which enhances its internal connectivity with employees and departments, and its external connectivity with its key stakeholders, partners, and customers (World Bank, 2018). The bank has also created an 'Incentive Framework,' which aims to improve knowledge sharing and reusing behaviours within the organization. Within this framework, World Bank (2019) identifies three key drivers: making knowledge sharing a more social process, making knowledge easier to share, and the linkage of knowledge sharing with self-development. Incorporated into each of these drivers are a set of incentives to encourage knowledge sharing behaviours. In terms of linking knowledge sharing with self-development, the framework identifies incentives relating to the desire for: confidence, feelings of accomplishment; personal recognition and visibility in the workplace; status; and individual and group value alignment. With regard to making knowledge easier, the incentives highlighted in the framework include making: remembering information, identifying information, and processing information simpler. Finally, in relation to making knowledge sharing more social, the Bank's incentive framework sets out incentives relating to the desire for: inclusion, social support, following formal norms, participating in management, and the desire for beliefs and actions to be consistent. The World Bank calls for a more human-centred approach to encouraging knowledge sharing behaviours in order to achieve significant and sustainable change. They advocate for an approach that is based on a deep understanding of how people are motivated and one which is grounded in validating frameworks to facilitate behavioural change.

According to Shepherd (2021), within the banking and finance sector, technology and innovation have traditionally been seen as the 'game changer.' However, he argues that within this sector, there is a growing acknowledgment that innovation does not happen in isolation and instead requires an in-depth understanding of internal processes. He claims that knowledge management, specifically knowledge sharing, is ideally positioned to provide this understanding and predicts that it will increase prominence in years to come within the banking and finance sector.

## **Knowledge Sharing within Higher Education**

Higher education is a unique sector in relation to the study of knowledge sharing. Higher education institutions are, in essence, knowledge-based organizations, and therefore have a substantial role to play in creating, sharing, and transferring knowledge through research (Fullwood et al., 2018). However,

unlike many other types of organizations, knowledge sharing is not often motivated by profit, although increasingly, there is scrutiny on the use of public money and social accountability of higher education institutions, and growing competition between institutions due to reduced funding (Secundo et al., 2015).

According to Dezdar (2017), the main motivations for knowledge sharing in a higher education context are related to non-monetary factors, including humility, interpersonal trust, reputation, self-efficacy, and the enjoyment of helping others. This is consistent with findings from Lombardi et al. (2020), who claim that the provision of monetary rewards for knowledge sharing can significantly impede the positive effect of intrinsic motivation and lateral integrative mechanisms on knowledge sharing, which in turn have a detrimental impact on employees' relationships and helpful behaviours. The growing interest in university-industry collaboration has emerged from the belief that such collaborative efforts may be a key source of innovation (Robertson et al., 2019). However, from a study of knowledge management by Abu-Rumman (2018), many structural barriers exist within many academic institutions that inhibit effective knowledge sharing both internally between departments and externally with industry. Therefore, despite being knowledge-based organizations, higher education institutions still have some way to go in achieving effective knowledge sharing.

## Knowledge Sharing during the COVID-19 Pandemic

The COVID-19 pandemic presented a unique knowledge challenge. Of particular note is the speed at which COVID-19 unfolded on a global scale amid the absence of relevant and reliable knowledge needed to orchestrate an effective response (Tovstiga & Tovstiga, 2020). Rao (2020) argued that speedy connectivity, content platforms, community participation, and a culture of trust were essential in delivering sensemaking and effective knowledge sharing practices during the pandemic response.

The World Health Organization (WHO) describes itself as a global knowledge sharing network for the public health workforce to enable faster access to and use of existing knowledge through the sharing of ideas and eHealth and eLearning to facilitate enhanced evidence-informed policymaking. At the start of the COVID-19 pandemic, the WHO claimed that transparent knowledge-sharing was crucial to combat the spread of the infection and created and shared vast amounts of knowledge about tackling the crisis (WHO, 2020). However, it was noted by Ekpenyong and Pacheco (2020) that the knowledge produced and shared by the WHO to tackle the pandemic was received and responded to differently by countries. Countries from the global north systematically ignored much of the WHO guidelines. Those from the global south mostly adopted and incorporated the WHO knowledge as a basis for their national response strategy.

In relation to the search for a vaccine, there was clearly a need for vaccine manufacturers to work in partnership. The WHO made an initial call for collaboration and for vaccine manufacturers and the pharmaceutical industry, in general, to voluntarily share knowledge, data, and intellectual property, but this was received with some resistance. The pharmaceutical industry, particularly in the area of biologics and vaccine manufacturing, traditionally does not share knowledge as it impacts their competitive advantage following significant investment in research and development. However, the increasing pressure and urgency of the situation meant that companies started to seek knowledge sharing and transfer. The challenges of COVID-19, in particular, have started to encourage a new form of knowledge sharing, which may significantly boost progress and technological advances in the vaccine industry in the future (Spadaro, 2020). However, others have noted that key barriers in the form of intellectual property rights have hindered this process, even with the backdrop of a global pandemic. Sariola (2021) asserts that such

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rights in the pharmaceutical industry are unethical and argues that COVID-19 vaccines should be seen as global public goods; otherwise, the protection of intellectual property rights to the vaccine companies are causing health and socioeconomic suffering globally. It is, therefore, apparent, as Nathavitharana et al. (2020) argue, further effort is needed to optimize knowledge sharing and tackle the inhibitors in the context of global outbreaks.

## **Knowledge Sharing to Support Community Development**

According to Al-Shqairat et al. (2020), knowledge sharing is also an essential feature of sustainable growth and development in local communities, and explore the example of using ‘Knowledge Stations’ in the middle-eastern country of Jordan to facilitate this. The aim of ‘Knowledge Stations’ is to improve digital information literacy in local communities by sharing and acquiring knowledge in this field. In doing so, improving knowledge sharing opportunities in areas such as health, environment, and education leads to community development and capacity building. McGinnis et al. (2020) also identify knowledge sharing via the use of information technology platforms as a key component of community development. In their study of indigenous knowledge sharing in northern Australia, they found that knowledge sharing through digital technologies supported the conservation of indigenous knowledge bases and, in doing so, provided channels for community empowerment and increased political relevance.

The United Nations (2015) also emphasize the importance of knowledge sharing in delivering the collective ‘Agenda 30’ which is a multi-national sustainable development program aiming to: end poverty and hunger everywhere; combat inequalities within and among countries; build peaceful, fair, and inclusive societies; protect human rights, and ensure the lasting protection of the planet and its natural resources by 2030. It argues that knowledge sharing can be a critical catalyst for achieving the sustainability goals of this agenda. It further argues that the role of local institutions, such as transit companies, disaster risk management agencies, and health organizations, are vital as they can make significant contributions of tried and tested successful solutions and evidence based best practices in relation to achieving all areas of the sustainability goals.

## **SOLUTIONS AND RECOMMENDATIONS**

The information and evidence presented in this chapter emphasize the need for organizations to have robust knowledge sharing mechanisms in place both in relation to their internal knowledge flows and their external knowledge flows. There is an increasing realization that innovation is dependent on knowledge sharing, and more structured processes for knowledge sharing are starting to emerge. The global pandemic has accelerated new ways of interacting and working, and this represents an opportunity for maximizing the potential for knowledge sharing. Therefore, it is recommended that understanding and strengthening knowledge sharing processes and mechanisms become a key priority for all organizations, sectors, and industries to achieve long-term sustainability and success.

## **FUTURE RESEARCH DIRECTIONS**

According to Ahmad & Karim (2019), five areas warrant further research in relation to knowledge sharing. This includes: examining knowledge sharing through an interaction and process approach to understand how individual, team, and organizational-level characteristics impact what is achieved through knowledge sharing; adopting a critical perspective to better understand the net impacts of knowledge sharing, with a particular focus on its potential unintended negative impacts; further examining the differential impacts of knowledge sharing including what type of knowledge is shared and how it is shared; examining in greater depth the psychological effects of knowledge sharing due to its association with psychological and social consequences; undertaking more qualitative research into better understanding the processes and conditions which influence knowledge sharing, and developing and utilizing new methodological approaches to understand the impacts of knowledge sharing better. According to Rajabion et al. (2019), future research should focus on the mechanisms for knowledge sharing in virtual communities and what factors can sustain longitudinal knowledge sharing. Silva de Garcia et al. (2020) recommend the future research focuses on unearthing the unexposed motivations behind knowledge sharing. Therefore, it is evident that there are varying views on the direction of future research to develop an understanding of the phenomena of knowledge sharing. However, there is a general consensus that whatever direction this takes, a greater understanding of knowledge sharing, its enablers, and inhibitors is needed across all sectors and industries.

## **CONCLUSION**

This chapter has outlined the benefits of knowledge sharing and has explored some of the most commonly cited enablers and inhibitors to effective sharing knowledge at an individual, organizational, technological, domestic, and international level. It is evident that there are a vast array of knowledge sharing methods that can be used depending on the type of organization and the type of knowledge to be shared. There is no single 'best practice' approach to knowledge sharing, and instead, a multitude of approaches may be needed to accommodate the individual needs and circumstances of organizations and their employees. Increasing globalization and continued advancements in technology are opening up new avenues for sharing knowledge and developing new forms of knowledge management systems. Furthermore, national culture impacts heavily on what approaches are used. The key enablers for knowledge sharing were described as having an enabling environment supported with the technical skills and systems needed to share knowledge. Trust was identified as both a potential enabler or inhibitor to sharing knowledge. Inhibitors were categorized at an individual, organizational and technological level including: demographic, sociological, and cultural differences between individuals, a lack of time and skills to communicate and share knowledge effectively, hierarchical structures, inadequate financing for training, systems and knowledge sharing infrastructure, lack of senior commitment and role models, and weak organizational culture.

It was apparent that while there are many commonalities in knowledge sharing practices in different sectors and industries, there is a greater emphasis on some approaches more than others, and the significance of national culture is emphasized. There is strong evidence to suggest that a 'one size fits all' approach to knowledge sharing, and knowledge management is not feasible, but there is equally strong



evidence to support the view that knowledge sharing should be a key priority for all organizational types and forms in order for them to survive and remain relevant in the future.

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## KEY TERMS AND DEFINITIONS

**Enablers:** Individual and organizational conditions which facilitate knowledge sharing.

**Inhibitors:** Individual and organizational conditions which prevent or hinder knowledge sharing.

**Intellectual Property:** Any product of human intellect that the law protects from unauthorized use by others protected as a patent, copyright or trademark.

**Knowledge Capture:** A process whereby knowledge that inhabits the mind of an individual can be converted into an explicit representation. Through the systematic capture of knowledge and expertise, organizations can continually improve their performance, accelerate decision making, and retain critical knowledge.

**Knowledge Flows:** Are the outflow and inflow of knowledge inside and outside of organizations.

**Knowledge Sharing:** The process of transferring tacit and explicit information, knowledge and/or experience from one person to another, from one department or team to another, from one organization or industry to another, or from one region or country to another.

**Learning and Knowledge Products:** Are an artefact of information and enables action by the reader via dissemination.

# Chapter 9

## Enabling Knowledge Flow: The Knowledge Management Triangle Model

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### **ABSTRACT**

*Organizations are facing many challenges to remain relevant in the face of new technology, emerging markets, and changing consumer behaviors. Many organizations look to become learning organizations with knowledge management strategies to leverage their knowledge assets and continuously innovate their strategies and products. However, organizations struggle to achieve success with knowledge management because their organizational culture does not support knowledge-sharing and must be adapted for this new behavior. Knowledge must flow through the organization, and so, therefore, these necessary behaviors must work within the existing corporate culture. Observations from a case study at a software company are discussed, and a new knowledge management model, the Knowledge Management Triangle, is introduced. The Knowledge Management Triangle is a simple model to explain and implement knowledge management within organizations and is customizable to work within the organization's culture to ensure the new knowledge management behaviors are appropriately adopted.*

### **INTRODUCTION**

Knowledge, by its very definition, is based on experience and, therefore, activity. For knowledge management to be successful, knowledge cannot be treated as a static asset within an organization; it must flow through the organization and create action for it to create value. Demonstrating value with knowledge management activities can be a challenge. Academics and practitioners create knowledge management models to describe knowledge management activities, enable the implementation of knowledge management activities within organizations, and to assess the maturity of these implementations. Knowledge management activities can take many forms, but one of the most important activities that delivers value is how knowledge flows through the organization (O'Dell & Grayson, 1998). This flow of knowledge

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is how an organization will learn from its knowledge assets, and it is how the organization will generate new learnings that it can leverage to create value; however, without the proper cultural reinforcements, the flow of knowledge can be trapped, and the knowledge management program can fail to make an impact (McDermott & O'Dell, 2001). Technology is often looked at to solve these problems, but organizational culture will make the most significant difference between success and failure (Zheng et al., 2010; Ruppel & Harrington, 2001). The organization's culture will impact employees' motivation to share knowledge, collaborate, and leverage others' lessons learned, not the information technology that the organization uses to facilitate these processes (Alvesson, 2002; Park et al., 2004; Ho, 2009). Furthermore, the best way to overcome cultural barriers to implementing knowledge management has been to work within the existing culture rather than changing it entirely (McDermott & O'Dell, 2001).

The objectives of this chapter are to discuss the importance of knowledge flowing through the organization, and how by doing this, organizations can become learning organizations. Organizational culture, how organizational culture impacts knowledge management, and the role leadership plays is discussed. The main section of the chapter explores existing knowledge management models that promote the flow of knowledge and how culture can enable or prohibit knowledge flows. A new knowledge management model, the Knowledge Management Triangle, is proposed and explored; this model leverages Maslow's Hierarchy of Needs (1943) as a mental model to facilitate greater understanding of the knowledge management model to employees who may not be familiar with knowledge management. Lastly, the chapter suggests how the knowledge activities can work with the culture to deliver results by leveraging observations from a case study at an organization in the software and technology industry where the Knowledge Management Triangle was implemented.

## **BACKGROUND**

### **Learning Organizations**

A learning organization has a systematic approach for adapting to the environment by leveraging new knowledge, insights, and ways of thinking (Wheelen et al., 2005). These organizations are adept at changing, experimenting, and using the knowledge they generate to improve the organization (Wheelen et al., 2005; Garvin, 1993). In a learning organization, knowledge management activities, continuous improvement initiatives, and other learning practices are prioritized and highly leveraged. Knowledge management activities specifically support the goals of organizational learning and enable the systematic growth required for the organization to be a learning organization (Gorelick et al., 2004). The term 'organizational learning' is sometimes used interchangeably with 'learning organization'; however, there are differences between these terms. Organizational learning is attempting to achieve the same outcomes as a learning organization; it is a process whereby an organization can leverage its knowledge to bring about better outcomes. Where organizational learning differs from a learning organization is that it is not as holistic or systematic. Organizational learning corrects errors and makes improvements (Argyris, 1977). To become a learning organization, an organization does need to engage in organizational learning. If the organization can do this successfully and maintain it over time, this is when the organization can become a proper 'learning organization.'

For an organization to generate value from its knowledge management activities and to be a proper 'learning organization,' the organization must apply the knowledge it has generated (Garvin, 1993;



## **Enabling Knowledge Flow**

Nonaka et al., 2006; Davenport & Prusak, 1998). The organization's knowledge cannot be stagnant in the organization; it must move through the organization and be used, re-used, and enhanced through these activities to be valuable (Gray & Densten, 2005). Knowledge management models are designed and implemented to facilitate the flow of knowledge through an organization and ensure that all components are aligned and contribute to the knowledge management strategy's desired outcomes (Dalkir, 2011). Learning and sharing knowledge are interactive and iterative processes (O'Dell & Grayson, 1998). The commitment to taking action from what the organization has learned will bring about continuous improvement, innovation, and results (Garvin, 1993; Staats et al., 2010). However, for the organization to truly learn from the knowledge it is capturing, it must engage in 'double-loop learning,' which allows prevailing mental models and ways of working to be challenged (Argyris, 1977). This means that the organization must be able to change based on what it has learned. These changes may be new strategies, roles or responsibilities, or stopping specific strategies or processes that are not achieving the desired outcome (Basten & Haamann, 2018). The organization must implement strategies to enable employees to leverage the organizational knowledge, not just to locate it (Jacobson & Prusak, 2006). Leveraging knowledge requires relationships to facilitate knowledge sharing and an ongoing commitment to learning each day and putting this learning to use (O'Dell & Grayson, 1998). It is not enough to identify and capture the proper knowledge, the value comes from the actions, and the organization's culture greatly influences these actions.

## **Organizational Culture**

An organization's culture is a shared understanding of how an organization works together through observable rituals, customs, and traditions (Schein, 2017) and their values and beliefs (Groysberg et al., 2018). It dictates how people will or should behave (Burnes & James, 1995; Watkins, 2013) and what will be deemed acceptable or not. This shared understanding impacts what the organization does, but it also impacts why it will do certain things and not others (Schorin & Wilberding, 2020). It results from shared learning over time (Schein, 2017), so it does require some time to develop with a consistent group of individuals (Lakomski, 2001). Actions play an important role in influencing beliefs, behaviors, and relationships (Islam, 2009) and incentives (Watkins, 2013). Historically, these actions come from senior leadership and are pushed down throughout the organization, often referred to as a "top-down" approach (Jackson, 2020). The top-down approach can be practical for setting strategy; however, the employees need to see their work reflected in the organization's mission. A strategy where employees are involved in this process, creating a "bottom-up" approach, can be more collaborative and generate better alignment on strategy, generating better long-term results (Jackson, 2020; Groysberg & Slind, 2012). The different events in the employee lifecycle are all opportunities to infuse the positive elements of culture into the organization; events such as onboarding, promotions, negotiations, and other celebrations will influence cultural beliefs (Islam, 2009; Schein, 2017). The organization's culture will influence all elements of the organization's essence (Alvesson, 2002). When a change needs to occur that may disrupt the dominant culture, this can be very difficult to navigate. However, one of the best methods to effectively navigate change is to involve the impacted groups to gather their insights and garner their support (Burnes & James, 1995). The challenge comes from implementing a change in regular routines that have been in place for a long time, and these can require deep organizational context to navigate (Lakomski, 2001).

All cultures are unique, and therefore what works for one organization may not work for another. Organizations need to look at their own culture, diagnose their challenges, and work within the culture to

find solutions (Ismail et al., 2007; McDermott & O'Dell, 2001). Groysberg et al. (2018) recommend that to understand an organization's culture, observe how people interact, and how the organization responds to change. Organizations that empower independence over interdependence may have a more competitive culture, whereas interdependence will encourage collaboration and teamwork. If an organization prioritizes efficiency, consistency, and maintenance, this organization may have a hard time with change; if the organization promotes more flexibility in its operations, it will typically be more open to innovation and change (Groysberg et al., 2018). When an organization has a strong sense of what it stands for and communicates and reinforces this message regularly, it has a better chance of positively influencing events and outcomes with culture (Schorin & Wilberding, 2020). However, even if the organization does not have a strong culture, culture is still at play and will influence outcomes (Alvesson, 2002). A strongly defined culture will have a vision or mission statement that emphasizes the organization's purpose and meaning; values that outline acceptable behaviors to make the vision a reality; practices that enable the values to come to life; and a detailed company history that demonstrates each of these elements. Some of these elements can be generated using a "top-down" approach; however, the organizational culture cannot exist without people who uphold it, and so a "bottom-up" approach where employees are involved in creating these elements will be beneficial. There will often be cultural influencers within the organization that can be leveraged to create cultural alignment between leadership and the employees. The organization's location may also influence the culture due to local customs (Coleman, 2013).

For an organization to transition from old ways to a more innovative and agile approach, organizations strive to become learning organizations; however, this change comes with many challenges. Many organizations focus on driving material benefits from the knowledge practice, such as better efficiency and cost reduction, but other qualitative benefits should be valued (Nonaka, 2007). Research findings from Gino & Straats (2015) demonstrate that organizations move to action too quickly; they expect too much upfront and focus more on the experts than the whole organization; instead, they recommend developing an organization with a growth mindset focused on potential. They also recommend implementing a reflective practice, also known as an "after-action review," to learn and analyze activities for their success and failures and leverage these as organizational learnings to drive improvements. After-action reviews are recommended in other literature on successful organizations (Coyle, 2018; Davenport & Prusak, 1998). Building a knowledge-sharing culture is imperative for a learning organization to be successful, and by doing this deliberately, the leaders can ensure that the appropriate, valuable knowledge is identified and leveraged (King, 2009) and that there is a consistent flow of knowledge creation and use (Ho, 2009; Banks, 1999). A knowledge-sharing culture should influence the organization's performance and enable the organization to shift processes and strategies due to its learning (Staats et al., 2010). Therefore, a knowledge-sharing culture requires a culture that can be agile and change quickly. Furthermore, everyone in the organization must participate in knowledge sharing, not just a few or only management; knowledge from the individuals doing the work is most valuable (Brown & Duguid, 2000). McDermott and O'Dell (2001) advise that the best way forward when implementing a knowledge management strategy is to adapt it to the organization's culture, and not the other way around since all cultures will be different and the knowledge management strategy needs to work within it. Successful knowledge-sharing cultures vary just as successful organizational cultures vary.

## **Organizational Culture's Impact on Knowledge Management**

The organization's culture directly impacts the success of knowledge management activities (Zheng et al., 2010; Park et al., 2004; Gray & Densten, 2005; Chen & Holsapple, 2009; Migdadi, 2009; Ho, 2009; McDermott & O'Dell, 2001). This impact is likely due to the culture influencing the beliefs and values that are prevalent in the organization, and these will either support or detract from the knowledge management strategy (Alvesson, 2002; Essawi & Tilchin, 2013; King, 2009; McDermott & O'Dell, 2001; Davenport & Prusak, 1998). Culture can cause costly investments to fail when workers stay attached to old beliefs and values rather than adapting to new ways of doing things (Ruppel & Harrington, 2001). The culture will affect how much effort employees put into the new knowledge-sharing activities. Cultures that are people-oriented, open-minded, and focused are more conducive to a knowledge-sharing culture. In contrast, organizations that are more rigid, professional, and focused on the job tasks rather than the company outcomes will prevent knowledge sharing from blossoming (Chen & Holsapple, 2009). A culture that places importance on collaboration is more conducive to a knowledge-sharing culture, and collaboration is a crucial ingredient in creating new knowledge (Migdadi, 2009). Knowledge-sharing activities require mutual trust and cooperation, and both of these factors are influenced by organizational culture (Ismail et al., 2007; Mueller, 2015; Migdadi, 2009; Ruppel & Harrington, 2001; Ribère & Sitar, 2003). The introduction of knowledge-sharing activities requires a high degree of trust from multiple angles. The organization must trust the employees to develop these new practices, and then the employees must trust each other for these practices to be successful. The knowledge-sharing successes must be trusted and celebrated by management to become an established practice that benefits the organization (Mueller, 2015). The importance of trust within the organization cannot be understated; employees must trust the organization. They must trust each other for knowledge-sharing activities to be successful and for the organization to succeed in taking risks, innovating, and learning (Ribère & Sitar, 2003).

Organizational culture can either be a barrier or an enabler for knowledge management activities. The culture of an organization will influence the behaviors of the workers in the organization (Zheng et al., 2010), and a general agreement must exist around knowledge: what will the workers capture, how will they use it, and how should changes be made with this new knowledge (Schein, 2017). When employees are concerned for each other and want to help each other, this is predictive of a more successful knowledge-sharing culture (Ruppel & Harrington, 2001). Different cultural elements will influence each activity within the flow of knowledge. In identifying and capturing critical knowledge, the organizational culture and strategy will signal what knowledge is necessary and worth sharing versus what should not be captured (King, 2009; Migdadi, 2009). Incentives and rewards may negatively impact knowledge sharing as some tasks may be rewarded more directly. Therefore, sharing knowledge becomes a less lucrative activity (Kathiravelu et al., 2013); an example would be someone rewarded for their output only and not helping others. Performance management has a strong influence on knowledge sharing (El-Farr & Hosseingholizadeh, 2019). Managers have a substantial role in motivating employees to share and use knowledge (McDermott & O'Dell, 2001). The organization's tacit knowledge will directly correlate with its culture, and so knowledge sharing of tacit knowledge must be promoted by the culture (Essawi & Tilchin, 2013). Knowledge use is also impacted by cultural elements such as trust, cooperation, collaboration or teamwork, and employees supporting each other (Park et al., 2004). Furthermore, the team structure and how the team uses organizational knowledge is essential; if the whole team uses the knowledge consistently, there will be better results than if only one or two members use the knowledge base (Staats et al., 2010). O'Dell & Grayson (1998) found that the transfer of best practices did not

work unless the organization had created the appropriate culture and climate to support these practices; it required information technology and endorsement from leadership, the correct type of measurement, and of course, culture.

Rewards and reprimands are significant activities within an organization, both for those who experience them and for those that witness these consequences happening to others (Schein, 2017). Creating and sharing knowledge and using others' knowledge can be influenced by organizational culture, and most specifically by incentives and rewards (Staats et al., 2010; Migdadi, 2009; Ho, 2009). Employees will have both intrinsic and extrinsic motivations that rewards or reprimands can influence. Intrinsic motivators are more predictive of job satisfaction, and they are accomplishment, recognition, greater responsibility, promotions, and challenging work (Herzberg, 2003). Extrinsic motivators are more predictive of job dissatisfaction, and they are salary, status, job security, oversight, working relationships, company rules and regulations, and working conditions (Herzberg, 2003). Extrinsic rewards have not been shown to influence knowledge-sharing behavior (Kathiravelu et al., 2013). The incentives that have been shown to work are more intrinsic such as the joy of helping others and when the knowledge sharing is tied to existing organizational values that are rewarded (McDermott & O'Dell, 2001). When knowledge hoarding or other behaviors that are a barrier to effective knowledge sharing are met with consequences, this also reinforces the positive knowledge sharing behaviors (McDermott & O'Dell, 2001; Ruppel & Harrington, 2001). Other factors that have enabled knowledge sharing are trust between team members, support from management, support of peers, and collaborative team behaviors (Kathiravelu et al., 2013; Park et al., 2004; Ruppel & Harrington, 2001). Descriptive roles and responsibilities and job descriptions that reflect knowledge sharing and other relevant behaviors also support a knowledge-sharing culture (Ho, 2009).

## **Leadership's Role in the Knowledge-Sharing Culture**

Leadership's role in implementing, maintaining, and nurturing a knowledge-sharing culture is an important one. Leaders act as beacons for employees within organizations; through their actions, they indicate what behaviors will be tolerated and rewarded and what will not (Schein, 2017). They are envoys of the corporate culture, and so if the organization is to usher in a knowledge-sharing culture effectively, leaders must be on board and be continuously supporting this new mission (Migdadi, 2009; Ho, 2009), and they must not ignore it (Schein, 2017). Successful leaders will share the importance of knowledge sharing and reinforce this message by tying it to the organization's values and other vital elements in the organization's culture (McDermott & O'Dell, 2001; Ribère & Sitar, 2003). These values may not necessarily be about sharing knowledge, but knowledge management activities may achieve them, and this will make ushering in the new knowledge-sharing activities seem more seamless to employees if it already resonates with familiar messages. Leaders must dedicate time for knowledge sharing activities and reinforcing this message, and transformational leaders are particularly well suited for this work; they inspire employees and motivate them to do things differently, they provide a clear vision for the future that focuses on the good of the organization and not their personal interests (Ribère & Sitar, 2003). As stated earlier, trust is critical in a knowledge-sharing culture. Leadership's actions will either build or deplete trust in the knowledge-sharing activities, so it is essential for leaders to constantly be building and nurturing this trust with employees (Ribère & Sitar, 2003).

## **ENABLING THE FLOW OF KNOWLEDGE**

### **Knowledge Management as an Activity**

For knowledge management strategies to be successful, knowledge must flow through the organization. Nevertheless, organizations often make the mistake of viewing knowledge as a static resource rather than a dynamic process, and this prevents the organization from realizing success with knowledge management (Ruppel & Harrington, 2001; Gray & Densten, 2005; Davenport & Prusak, 1998). As Short & Azzarello (2004) stated, “knowledge itself cannot be “managed” in the traditional sense of the word” (p. 32). Knowledge activities must be thought of as processes that must be enabled, not only the technology that houses them. The knowledge management model is the path that the organization’s knowledge takes to become valuable to the organization (Dalkir, 2011). These align to some form of knowledge capture, storage, and usage (Migdadi, 2009). However, as discussed earlier in this chapter, the process may exist, but it may not be successful if it does not align with the organizational culture. Therefore, the appropriate cultural steps must exist alongside the knowledge management practices, but this is not always included in the discussion of knowledge management models.

### **Knowledge Management Models**

The SECI Knowledge Spiral, created by Nonaka & Takeuchi (1995), is a well-known knowledge management model. It describes how knowledge flows through the organization from an individual to the collective by knowledge assets moving from tacit to explicit knowledge. Tacit knowledge is typically defined as the knowledge and experience that is in people’s heads, whereas explicit knowledge is documented and defined and more easily transferred to others (Gorelick et al., 2004). The model emphasizes identifying the correct kinds of knowledge for the organization (Nonaka, 2007) and that this knowledge needs to be part of constantly improving the organization and its efficacy. The model describes four steps for knowledge to flow through the organization: Socialization which is tacit to tacit exchange; externalization, which is tacit to explicit; combination, which is explicit knowledge tied to other explicit knowledge; and internalization, which is when explicit knowledge is leveraged into tacit knowledge and experience. The creators of this model propose that metaphors and other creative language are used for tacit knowledge exchange. Metaphoric language may be a difficult entry point for organizations to begin a knowledge management practice. However, it could be a meaningful way to tie the knowledge management strategies to the organization’s existing culture. Furthermore, the model does not address how knowledge should be stored or used directly, and these are essential facets of knowledge flowing through an organization. Others have criticized the model for lacking specific instructions that lead to action (Garvin, 1993). As a theoretical framework, the description of transforming tacit knowledge to explicit is an important one, and this certainly facilitates organizational learning. However, the required activities to facilitate this transformation are elusive and difficult for organizations to understand and implement, especially if they are new to knowledge management.

Gray and Densten (2005) proposed integrating the SECI knowledge spiral (Nonaka & Takeuchi, 1995) with the Competing Values Framework developed by Quinn (1988). This integration is an attempt to combine the knowledge spiral with components of organizational culture. The Competing Values Framework explores different organizational culture elements, such as if the organization has an internal or external focus or a stable or flexible structure (Gray & Densten, 2005, p. 595). The authors chose

to integrate these two models because they both evaluate organizational effectiveness. They do this by analyzing the internal operational processes of organizations; they also both value the social elements of knowledge sharing. Essentially, combining these two models provides a greater understanding of how knowledge flows through organizations and the organizational culture elements that may impact the efficacy of knowledge management initiatives. The model does not include activities that would enable the organization to be effective with knowledge management. Therefore, practitioners may struggle with implementing this model, despite having a better understanding of organizational culture and how it interacts with knowledge management.

Ho (2009) described five components that need to be present in a knowledge management model: “1. Knowledge creation; 2. Knowledge stimulation; 3. Knowledge sharing; 4. Knowledge utilization; and 5: Knowledge internalization” and describes knowledge management enablers that need to be present in the organization to ensure the flow of knowledge is successful. These enablers are information technology, culture, strategy and leadership, and an organizational incentive system. When all of these components work together, this is when organizations can achieve success with knowledge management. This model is based on learnings from survey data from 550 small and medium companies in industries that require knowledge-related activities such as finance, information technology, and manufacturing; however, the companies are only from Taiwan. The researchers found that strategy and leadership led to the most positive effects on knowledge management implementation. This model’s strength is that it integrates knowledge activities and cultural and organizational structures to enable the knowledge management strategy to thrive.

Evans et al. (2014) studied many historical knowledge management models and proposed the Knowledge Management Cycle (KMC), which provides a holistic view of how knowledge can flow through the organization. The KMC emphasizes the actions that need to occur so that knowledge is treated as an activity and not a static asset. The authors cite Heisig, who studied 160 knowledge management models and frameworks and identified that the most common activities included: use, identify, create, acquire, share, and store (Evans et al., 2014). The KMC includes seven steps: identify, store, share, use, learn, improve, and create, and it demonstrates how the knowledge that is learned can be leveraged to create new knowledge or improve existing knowledge. The authors highlight that the model’s strength is that it includes “double-loop learning” (p. 95) and that this allows organizations to emphasize the need for continuous improvement with knowledge management which is essential for success with knowledge management activities. The model also builds off several other models, and so the activities required for knowledge to flow through the organization are well identified and described. The model does not include the cultural elements that Ho (2009) and Gray & Densten (2005) described in their models; however, the double-loop learning emphasizes the need for organizations to continuously leverage their knowledge, which is an important element to ensuring success with knowledge management.

When implementing knowledge management in organizations, many variables need to work in concert to produce successful results. However, a critical element that has not yet been discussed is that knowledge management is implemented with people, and these people will not necessarily be knowledge management practitioners. The knowledge management practice needs to become part of how the organization works, not just extra tasks that can be easily de-prioritized. A simple model that provides a clear indication of steps and their importance to the organization is needed. A simple knowledge management model will be presented in the next section, and observations and experiences from an organization in the software-as-a-service industry will be presented to demonstrate how the model can be used within an organization.

## **SOLUTIONS AND RECOMMENDATIONS**

### **The Knowledge Management Triangle**

When organizations are new to knowledge management, the existing models within the field may be daunting. While theoretically, these models include the necessary steps for success with knowledge management, if an organization cannot easily apply the model, they will not see the desired outcomes. Knowing that organizational culture is also a barrier to implementing knowledge management successfully, the model must work with the organization's culture to be adopted by the organization. Leveraging the models discussed earlier in this chapter, a new knowledge management model is proposed. The model is the Knowledge Management Triangle and is presented as a triangle similar to Maslow's Hierarchy of Needs (1943). The intention is that users understand that specific tasks need to be completed, in order, to achieve the knowledge management strategy's desired outcomes. Maslow's Hierarchy of Needs is a well-known mental model, and so it was believed this would facilitate understanding of the knowledge management strategy and necessary activities. The Knowledge Management Triangle model contains only five steps to keep it simple. It includes some of the aforementioned critical tasks for a knowledge management strategy, such as knowledge capture, storage, and usage (Migdadi, 2009) and leverages and simplifies the steps within Ho (2009) and Evans et al. (2014)'s models. The model's goal is to achieve organizational learning, and the placement of this goal at the top of the triangle can be an important signal that ties the knowledge management model to the organization's culture.

The Knowledge Management Triangle includes five steps: 1) Identify and Capture Knowledge; 2) Storing Knowledge; 3) Knowledge Sharing; 4) Knowledge Use; 5) Organizational Learning. Each step identifies the knowledge management activity that needs to occur, and each step must be completed for the next step to occur. When all steps have occurred, the organization will achieve its desired outcome of organizational learning.

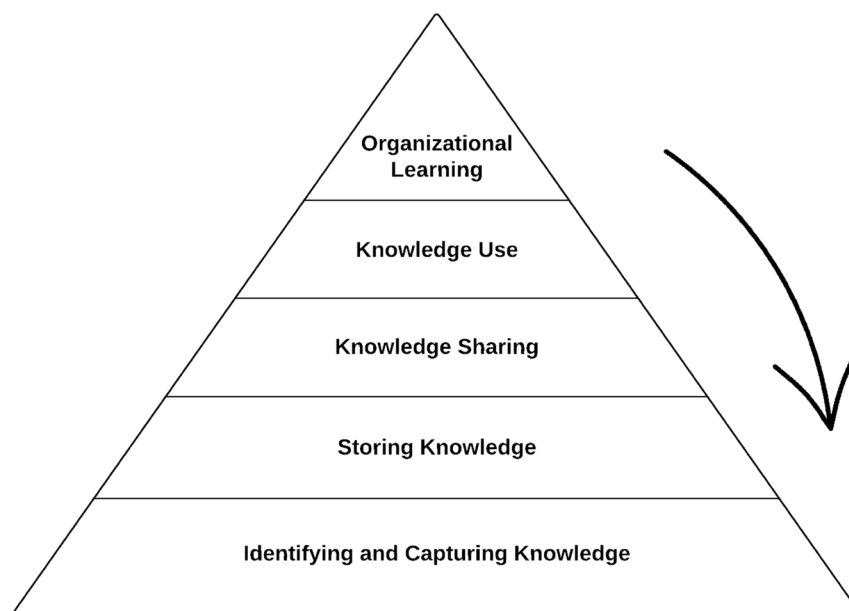
1. **Identify and Capture Knowledge:** In this step, both explicit and tacit knowledge can be identified and captured, and made into an asset. Data and information can also be captured in this step. The intention is that the organization is capturing content that will be relevant to others, and so this step requires consensus amongst members in the organization of what is valuable knowledge (or information) and how it should be captured so that others can make use of it.
2. **Storing Knowledge:** This step identified that knowledge must be stored in a repository. The knowledge must be searchable and discoverable to others. This clearly indicated that knowledge must be moved to the appropriate location and not left in a temporary location like an email inbox.
3. **Knowledge Sharing:** If knowledge is captured and stored, but others are not aware of this new knowledge, it will be challenging to move to the next step. A common barrier to knowledge transfer is that while the knowledge existed within the organization, others did not know it was there (O'Dell & Grayson, 1998). Employees need awareness of the knowledge management activities and the new knowledge in the organization to leverage it. Knowledge sharing can be accomplished through sharing by ephemeral means as long as they link back to the knowledge repository.
4. **Knowledge Use:** This is a critical step. The captured knowledge must be used, and this usage must generate new actions within the organization if the organization is going to achieve the desired outcomes of knowledge management and organizational learning. It is recommended that usage is measured to ensure the knowledge management activities are being adopted. Ideally, the usage

will indicate improved organizational effectiveness by being correlated to other key performance indicators.

5. **Organizational Learning:** The fifth step is the intended outcome for the Knowledge Management Triangle. Organizational learning can be achieved when each step of the model is completed and the new knowledge being leveraged generated a new action within the organization. This step also emphasizes a continuous cycle. Once the organization has a learning output, it was time to return to the bottom of the triangle, capture this learning, and put it through the rest of the model (as indicated by the arrow in Figure 1).

The top of the triangle is an important signal to employees and users of the model. Maslow’s Hierarchy of Needs has ‘self-actualization’ at the top of the triangle to signal the model’s goals. Self-actualization was intended to describe that a person was doing what they were meant to do and living up to their potential (Maslow, 1943). This is a valuable reference for the Knowledge Management Triangle to leverage so that when knowledge management is implemented using this model, this step signals to employees what leadership is hoping to achieve by investing in knowledge management. The Knowledge Management Triangle has ‘organizational learning’ at the top; however, other messages could be chosen, such as quality, continuous improvement, safety, or anything relevant to the culture of the organization where it is being implemented. While the model does not discuss the cultural enablers that are the strength of Ho’s model, the top of the triangle is where the model can be explicitly linked to the organization’s culture, which is a strength of this model. This step explains the “why” behind the knowledge management strategy, and at the same time, it explains the benefits which should be at the forefront to create change within the organization.

*Figure 1. The knowledge management triangle, Source: (Tessier, 2021)*





## **The Knowledge Management Triangle in Action**

A knowledge management strategy was implemented at an organization in the software-as-a-service industry, specifically in the Customer Support department. The organization's starting state was that it had multiple knowledge repositories with various internally created content and links to external resources. There were no formal roles or responsibilities for knowledge sharing, and much information was being shared through email or other asynchronous channels but was not captured in the knowledge repositories. The content that had been documented in the knowledge repositories had not been maintained, and so there was incomplete, inaccurate, or outdated content, and this had diminished overall trust in the knowledge resources. The content was also disorganized, so it was difficult for users to find what they were looking for or discover new content. There was frequent person-to-person sharing enabled by information technology rather than a systematic flow of knowledge. When individuals shared information, they would not direct each other to the knowledge base since this was not seen as the trusted source of information, despite the information being present in the knowledge base. The result was that the organization was suffering from both a lack of quality knowledge and information overload at the same time.

The organization's strengths were that it had a well-defined mission and explicit organizational values tied to sharing information, being a continuous learner, and being adaptable to change, alongside other important values to the organization. These cultural values were enforced and positively reinforced throughout the organization, and especially by senior leadership. The values were taught during employee orientation, and they were shared alongside stories of employees who had demonstrated the value and the positive impact they had made to the organization. The organization had a recognition platform where peers or leaders could recognize employees for actions corresponding with cultural values. There was also a strong team spirit with a desire to help one another and community feeling that everyone was "in it together," which created a collaborative and supportive work environment. Employees did not see their knowledge as power or that it needed to be protected from others and only used for their benefit; they wanted to share their experiences and what they had learned with their peers, and most employees were doing so (albeit in an uncoordinated way). Some rituals promoted knowledge sharing, such as a weekly organization-wide meeting that featured information from executive leadership or project and program leaders. The department had a practice where anyone could email the group with new information, and the practice was to include "EDU" (short for education) in the email title.

The necessary ingredients for knowledge management existed: a culture that valued learning, a mindset of flexibility, and adaptability for change. However, there was still a need for a formal strategy to be designed and implemented, and this implementation would require a solid link to the culture if it were going to be successful. The organization's main concern was its ability to scale and meet a growing number of customers' demands. The Customer Support department had previously been in one office. It had recently moved to a remote and distributed model, which was also motivated by the need to grow its operations significantly to meet the growing demand of customers requiring support. A knowledge management strategy was identified as something the organization would need to scale its operations; however, this was not a skill set that the organization had currently, and so this skillset was hired for and brought into the organization. While leadership agreed to this change, there was a lack of understanding of how the organization's challenges could be helped by knowledge management by the rest of the employees in the department. The challenge was implementing new knowledge management behaviors in an organization where employees mostly felt they were already sharing knowledge and that the correct knowledge repositories and information technology were already in place.

While the organization had captured content, it was not always helpful or easily discoverable, so it was not delivering the required value to the organization. Essentially, the value was trapped due to a lack of knowledge flowing through the organization efficiently and effectively. The organization required a mental model that would help them understand knowledge management, the gaps they currently had, and how that could be improved by knowledge management to establish an understanding for the organization to be motivated to change. All employees needed to understand this strategy and how they fit into it for the new knowledge-sharing behaviors to be effectively adopted and leveraged. While there were many positive qualities within the organization to leverage to make this change, there still needed to be a rallying statement or vision for what knowledge management could bring to the organization and why it was worth everyone's time. Furthermore, the strategy needed to align to the existing strong culture that was in place so that it would be adopted and not rejected by the organization.

The Knowledge Management Triangle was implemented within the organization to align the new knowledge management activities with the existing organizational culture and ensure knowledge was flowing through the organization and creating the desired organizational learning outcomes. The model was presented to senior management alongside an evaluation of where the organization was doing well and where they had an opportunity to improve. The Identify and Capture Knowledge and the Sharing Knowledge steps were identified as strong as employees regularly share information; however, it could not be used since it was not stored correctly. Storing Knowledge and Knowledge Use were identified as the areas for improvement. Furthermore, highlighting the knowledge management tasks, the order they needed to be completed, and the fact that the benefits of knowledge management could not be achieved until all steps were completed is beneficial to illustrate how the value of the organization's current knowledge was trapped and needed to be coordinated to flow more easily so that the value could be realized. The senior management group was asked to agree to the intentions of the Knowledge Management Triangle and that 'Organizational Learning' should be the top step. After this alignment was reached, the model was presented to other business areas and was regularly used to demonstrate where knowledge was effectively flowing through the organization and how that made the organization better so that the model was positively reinforced. This created a common language, and it aligned the activities to the organization's culture so that it could be appropriately digested and adopted within the organization. Alignment with senior management was created, but the culture change was needed with employees, so each step within the triangle was aligned to the organization's culture and existing activities so that it could be appropriately implemented:

1. **Identify and Capture Knowledge:** This step requires consensus amongst members in the organization of what is valuable knowledge and how it should be captured so that others can make use of it. Employees were asked to contribute feedback on what facets should be included to make knowledge helpful. Existing resources that were highly leveraged were analyzed for their commonalities and leveraged to design the format of knowledge capture. The type of content and the format of the content were clarified for this step, and it was made clear that everyone in the organization could be a contributor to the "identify and capture" step. The knowledge repository allowed everyone to be an author, and these permissions were maintained to ensure full activity. Whereas other organizations might limit authoring permissions, it was necessary for this culture that there is an openness to the repository to encourage participation. It was also made clear that the time employees spent contributing to the knowledge repository would be valued.

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2. **Storing Knowledge:** As part of the organization's implementation plans, the number of repositories was reduced to provide one source of truth and facilitate more accessible storage and knowledge discovery and use. This "Store" step also encouraged all content to be stored somewhere that would be accessible to everyone, including the large number of new hires that were planned. The knowledge repository was promoted for storage instead of sharing knowledge in email since that would not be accessible to new hires who would continuously join the organization as it grew. As previously mentioned in the "Identify and Capture" step, it was important that everyone feel they can participate in the knowledge management activities. The knowledge repository was open to anyone; there were no limited permissions so that everyone could access and benefit from all the available knowledge. Lastly, the "Store" step required that when knowledge was stored, it followed the new information architecture and titling format to ensure easy discoverability for everyone.
3. **Knowledge Sharing:** This step signaled the importance of sharing the knowledge that had been captured, and it also positively reinforced ongoing learning, which was a significant cultural value for the organization. This step also called for changes to ongoing processes. When employees were sending "EDU" emails, they now shared the content with a link to the knowledge repository, rather than just sharing content in an email. Healthy habits around sharing were also introduced and reinforced to ensure that there was no "oversharing" or creating information overload for employees. A weekly newsletter was created to highlight new additions to the knowledge base and other important announcements, and the result of this was less noise for employees in their email inbox while still improving their awareness of the knowledge that was now available to them. The knowledge management team also demonstrated this step by continuously sharing updates on the progress made to improve the knowledge repository by cleaning up content, ensuring its accuracy, and ensuring its usefulness. Due to the historical lack of quality content, many employees did not trust the content. By continuously sharing the content's improvement, the employees began to build more trust with the knowledge repository, which positively reinforced them to use it and aligns to the fourth step.
4. **Knowledge Use:** For implementing this step, the messaging highlighted the importance of using the knowledge repository and leveraging it in day-to-day work to improve internal operational efficacy. This is also where some values alignment work was needed to ensure employees would leverage the content to be more efficient, rather than reinventing the wheel and trying things from scratch. Messaging that was relevant to this step highlighted how a growing organization is always going to have new complex problems to solve, and so, therefore, making use of existing knowledge to be more efficient would enable employees to leverage what the organization already knows so that they have more time to solve the new emerging complex problems. Knowledge use was regularly measured and reported on to demonstrate the growth of the knowledge management program and how the employees had adopted the knowledge management repository.
5. **Organizational Learning:** To ensure a complete understanding of the need for knowledge management and its intended outcomes, the Knowledge Management team regularly shared stories that demonstrated the impact of knowledge management and how the organization was getting better and learning more based on the knowledge activities that were taking place. The title of this step was chosen to ensure values alignment between the knowledge management activities and the organizational culture.

The knowledge management activities, and therefore the introduction of a more robust knowledge-sharing culture, were positively reinforced throughout employee onboarding, team meetings, messaging from leaders, and informal recognition. The appropriate knowledge-sharing behaviors were taught to new employees through their employee onboarding. Due to the organization's growth, the new employees could usher in change due to their numbers. While the organization did bring in some external expertise to initiate the knowledge management strategy, the knowledge management team that formed to carry out knowledge management tasks was made up of existing employees who showed an interest in knowledge management and were passionate about making a difference for the organization by learning and applying these new skills. A tenured team helped establish credibility with existing staff by demonstrating a deep understanding of how work was being done and how knowledge management could help. Different parts of the knowledge-sharing culture were measured in different ways, and these measurements were leveraged for ongoing improvements to the knowledge management strategy. The amount of new content was monitored and the amount of content created by employees versus the knowledge management team. The goal was to ensure employees were generating the majority of the content to ensure a good level of employee participation as they would have the most valuable knowledge for the organization. The usage of the content was also monitored, and it was anchored against other performance metrics to ensure the usage of the content as a habit was actually growing and not just affected by the organization's scale and growth of new employees. The knowledge use grew by over 1000% in five years (as indicated by the % of content used in relation to incoming customer inquiries in Table 1). This usage number was constantly shared and discussed so that the usage was also recognized and positively reinforced by leadership. The organization did not implement many formal rewards or recognition; however, the knowledge management activities were often celebrated through the existing recognition system and aligned with the existing organization's cultural values, which in reality, is better since this showed a complete integration of the knowledge management activities with the organization's pre-existing culture.

The Knowledge Management Triangle was a helpful starting point for the organization to begin its journey of creating a knowledge-sharing culture and implementing knowledge management best practices. The model enabled a greater understanding of the changes that needed to occur. However, this understanding alone did not create success but rather enabled success by aligning intentions and actions, leading to better outcomes. By understanding the culture and working within it, the Knowledge Management team created a strategy that the organization could adopt. The organization has successfully embedded knowledge management practices in the work, and as shown in Table 1, are seeing growth in their core metrics around usage, content accuracy, and knowledge sharing. These observational metrics demonstrate that the knowledge management program has been adopted and leveraged within the organization. (To demonstrate the efficacy of the knowledge management program, these metrics should also be linked to key performance indicators; however, this is out of scope for the discussion in this chapter.)

## **FUTURE RESEARCH DIRECTIONS**

The Knowledge Management Triangle was implemented at one organization, in one industry, in a North American culture. Future research that implements the model in different organizations, in different industries, and within different macro cultures will be essential to demonstrate its actual efficacy in helping organizations' implement knowledge management activities and drive value from these activities. As organizations continue to go through digital transformations and other evolutions that require more

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Table 1. Knowledge use over time

Metric	2015	2020
Number of knowledge repositories	9	4
Content up-to-date	50%	90%
% of content used in relation to incoming customer inquiries	7%	93%
% of contributions to the knowledge base from outside the Knowledge Management Team	N/A	85%
Number of employees within Customer Support department	~300	~3000

Source: (Tessier, 2021)

knowledge management, it will be essential for research to continuously be conducted on how these transformations are going, what lessons can be learned, and how to help organizations thrive in the new digital realities of the modern world. Organizational cultures can be elusive, so additional case studies on how knowledge management interacts with culture and how knowledge management activities can be more effective within different cultures will also be helpful research.

## CONCLUSION

For organizations to thrive in the twenty-first century's digital culture, knowledge management practices are needed to ensure ongoing learning, development, and innovation. Knowledge management strategies are not just about implementing models or information technology. They are about establishing a knowledge-sharing culture that encourages and rewards these behaviors. They must keep people at the heart of the strategy. The Knowledge Management Triangle is a simple model that enables individuals to understand the required steps for knowledge management to succeed while keeping the motivation for knowledge management front and center at the top of the triangle. Furthermore, the model helps individuals understand where valuable knowledge may be trapped in the organization and create a plan for rectifying this situation. When organizations can leverage learning from across the organization to improve continuously, they become greater than the sum of their parts, and genuinely transformational achievements become possible.

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## **KEY TERMS AND DEFINITIONS**

**Culture Values:** Principles that organizations deem important for the success of the organization. They are typically determined by senior leadership and leveraged as a model for proper behavior and decision-making.

**Knowledge Hoarding:** When teams or individuals withhold knowledge, information or learnings from the organization's knowledge repository and others in the organization. This behavior is usually motivated by self-preservation, a need to feel secure within the organization, or some other general need to have power over others. It negatively impacts the organization's knowledge management strategy because the organization does not have access to what these individuals know.

**Knowledge Management Model:** A method of conveying knowledge management activities and how they function. It is used as a learning tool to make these complex systems easier to understand.

**Knowledge Repository:** A system or tool that is used to store and access organizational knowledge, artifacts, and other content. Often referred to as an intranet, database, or knowledge management tool.

**Knowledge-Sharing Culture:** A culture that promotes the communication, transmission, and absorption of organizational learnings and experiences so that the individuals within the organization may learn from each other and improve the organization's overall performance.

**Learning Organization:** An organization that has a systematic process of leveraging its knowledge to continuously change and improve.

**Organizational Culture:** The beliefs, values, and systems that guide how individuals within the organization behave and accomplish tasks. A common way of explaining this is "how the work gets done when no one is watching."

**Organizational Learning:** The way organizations learn from their existing practices and outcomes and continuously improve and drive better performance in the future.

**Tacit Knowledge:** The experiential and personal knowledge that a person gains through experience and resides in their head.

# Chapter 10

## Why Do Lessons Learned Often Fail? An Analysis of Experiences

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### ABSTRACT

*Organisations know they should do lessons learned. Standards like ISO9001 and ISO30401 say they should. Many try; few succeed. Traditionally, the first answer to the question is “lessons were observed, but not learned,” which reflects meaningful action was not taken as a result of the reported lesson. A lesson may have been identified, but nothing changed. As a result, learning did not happen. So why is this so? It is important to identify the ways in which the process towards effective lesson learning is becoming lost within the stages and how knowledge practitioners and those responsible for lessons learned can best help. This chapter will attempt to drill down on this answer, concentrating on the processes deployed and the real-world issues around the lesson-learning process.*

### INTRODUCTION

Organisations that are looking to improve their bottom line, reduce costly repeat mistakes, and make use of their organisational memory need a lessons-learned practice. Organisations looking to leverage international expertise and standards use the International Organisation for Standardisation (ISO) standards to benchmark their companies' operations, and to set goals for continuous improvement. The ISO30401-2018 Knowledge Management outlines the requirements for the management system around Knowledge Management. The definitions from this standard have been improved and added to ISO30400 – Human Resource Management – Vocabulary. It defines lessons-learned as “changes in behaviour as a result of learning or of recommendations from experience” (p. 28). The intent is clearly to affect future actions. This intention is not always emphasized, leading to the lessons-learned initiative being seen as a negative “inquiry” or even “witch hunt” where blame is associated. Creating a no-blame environment is fundamental to success, and the chapter discusses this. The failure to change behaviour is at the heart

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## **Why Do Lessons Learned Often Fail?**

of failure in lessons learned. This chapter will explore the reasons for the gap between an identified issue and the lack of a change in behaviour.

Knoco ([www.knoco.com](http://www.knoco.com)) runs a tri-annual Global Knowledge Management Survey (Milton, 2020), and the 2020 results concerning an optional section on lessons learned (100 responses out of 453 total responses for the whole survey) showed that respondents scored the effectiveness of their Lessons Learned program at 58% (56% in 2017) ranging from 36% in Finance and Insurance up to 66% in Utilities. A custom-built lessons learned system was rated the most effective storage method. Additional independent self-assessed online surveys on lessons learned run by the author suggested an average satisfaction rate of 43% from 2,500 responses. Many organisations are interested in implementing lessons-learned systems to improve the effectiveness of their organisation; however, they struggle to see success with the system.

This chapter steps through the real-world issues behind the perceived failure of lessons-learned from the starting point of management recognition of the regime through to practical problems implementing action plans. Common challenges with implementing lessons learned are explored, such as the lack of a defined and mature lessons management system, as well as organisational cultures that prevent the necessary organisational learning muscle so that lessons learned can be applied to established practices. The major section of the chapter examines the process in detail, highlighting typical reasons for “failure.” The chapter also canvasses an observed phenomenon where “Business as Usual” does not include the opportunity, capacity, and need for improvement, which mitigates against lessons learning. For organisations to achieve success with a lessons-learned regime, the metaphor of a Knowledge Supply Chain is used to illustrate a similarity between an established process and regime; and what needs to happen with lessons-learned so that they are successfully implemented within organisations. Each step is discussed in detail so that lessons learned can provide the organisation with a valuable return on investment.

## **BACKGROUND**

### **Why do Lessons-Learned?**

It is generally accepted that organisations should learn from experience. Lesson-learned initiatives are typically implemented as debrief sessions after projects and other events within organisations so that teams can learn from what went well or what could be improved upon for future initiatives (O’Dell & Hubert, 2011). The intention is that the organisation will benefit from reviewing their actions and will learn from their experience, bringing about greater outcomes in the future. Birkenshaw and Haas (2016) have conducted research over ten years at more than 50 companies and see a positive ratio where the benefits of collecting lessons learned and actioning them outweigh the cost of failure and the cost of collecting lessons. This practice is the standard measure of return on investment for lessons learned. Companies that adopt suitable cultural supports for the lessons learned initiative are more likely to see these benefits.

How do lessons learned Work?

Lessons-learned are:

Collaborative sessions [that] allow project stakeholders to discuss:

- what went well (especially any new tools or methods that produced positive results),
- what went wrong (especially issues that the team could have mitigated or avoided), and

- what changes the organizations should make or what they might do differently in the future.

The meetings give project teams an opportunity to address internal differences in opinion about decisions and outcomes, as well as build consensus for the best approaches moving forward. Lessons learned conversations also help project managers examine risks associated with their projects and document how the team is managing and minimizing those risks. (APQC, 2017a)

Discussion on the method of conducting these sessions is covered later in the section – Documenting Lessons.

## **Organisational Learning**

For organisations to learn from their lessons-learned initiative and benefit from the initiative, it is widely accepted that the right learning culture and muscle for organisational learning must exist (Birkenshaw & Haas, 2016; Edmondson, 2017; O’Dell & Hubert, 2011). Organisational learning happens when “individuals, groups, and teams continuously engage in new processes to acquire, capture, store, disseminate, and reuse knowledge” (Gorelick et al., 2004, p. 25). For organisations to transmit knowledge that will help them grow, tacit knowledge that is based on the experience of the individuals and is commonly seen as the knowledge within their own heads is typically seen as the type of knowledge that will enable organisational learning (Nonaka, 2007). But identifying tacit knowledge is not enough; organisational learning must be enabled by a system that allows knowledge to be continuously captured, shared, and leveraged (Gorelick et al., 2004). The SECI (socialization – externalization – combination – internalization) model developed by Nonaka (1990) describes a method that enables organisations to capture tacit knowledge and ensure this is shared throughout the organisation. The most critical component to enable a strong lessons-learned practice is socialization. Socialization is the transfer of tacit-to-tacit knowledge, and this is where lessons learned initiatives could enable this type of knowledge transfer through after-action reviews or other debrief sessions. For the learning to be systematic, the tacit knowledge must be captured and made explicit; this is the externalization step in the SECI model. Once the knowledge is made explicit, it can be combined with other explicit knowledge such as other documented processes or procedures so that others within the organisation can easily apply the knowledge; this is the combination step. Once others can apply the knowledge and experience to the new way of accomplishing a task or initiative, then this becomes their tacit knowledge, and this is the internalization step whereby individuals have learned from the experiential knowledge of others. The chapter will discuss how lessons learned can be captured in a lessons management system to be more easily leveraged by the organisation.

## **EXPLORATION OF THE ISSUES WITH LESSONS-LEARNED**

### **Why Many Companies Do Not Have a Defined and Supported Lesson-Learning Regime**

It seems obvious that they should, so why do so many not have such a system in place? In Knoco’s research, it was found that lesson-learning is not actually seen as significant by senior management; or not significant enough to do it properly. The survey results quoted earlier indicate that there are only moderate levels of satisfaction, repeated on a historical basis.

## ***Why Do Lessons Learned Often Fail?***

It is interesting to note that in the author's experience, from the time senior management details someone to be responsible for looking at lesson-learning, there are about six weeks before priorities change, and lesson-learning is no longer as important as it was. The investigations must be done in that time, and a proposal made ready, discussed, and an outcome agreed upon. This timeframe seems independent of the cost or size of the organisation.

The next problem is that the lesson-learning proposition is often framed as a quality issue, not a bottom-line profit issue. (This chapter will continue to use profit, but for Not for Profit (NFP) or public sector organisations, it refers to organisational effectiveness.) Of course, lesson learning contributes to quality; ISO9001-2015 specifically refers to it, as does ISO30401-2018 and several other standards and frameworks. But if quality or compliance is the prime reason for attempting lesson-learning, it will probably fail because bottom-line pressures will always take precedence in senior management thinking.

Effective lesson-learning can improve profit if an organisation embeds learning from the past into improved processes for the future, leading to better outcomes. The value of each lesson depends on the value of the process improvement multiplied by the frequency of repeat application. This applies to positive lessons (opportunity for gain) as well as problems (potential to lose more in the future). A good supporting lesson-learning software can use this measure to report the value of lessons. A similar but alternative measure or set of measures can be derived for NFP and the public sector.

But how does that help the initial decision to embrace lesson-learning? The author uses the same approach when an organisation is addressing lesson-learning for the first time. If organisations already have some recorded lessons, the author asks for a sample of lessons, conducts the profit effect exercise with staff, and presents the current and future value should the lessons be addressed. Alternatively, the author looks at evidence of repeat problems and tries to put a value on the money currently being wasted because lesson-learning is not in place.

There may have been a major incident which the management must (and must be seen to) address. However, it is unlikely that a single event will trigger the introduction of lesson-learning, which is more likely to be dealt with by some other direct action.

The NASA review in 2001 (NASA, 2001, p. 2-3) identified several typical problems in implementing lessons learned.

- Limited sharing of lessons learned agency-wide: Comments covered silos of knowledge. Sharing of lessons mainly occurs during project review and on an informal basis.
- LLIS (the Lessons Learned System) is not a primary mechanism for collecting and sharing lessons learned: Comments included an observation that in the two previous years, 43 percent of program and project managers have not submitted a lesson to LLIS.
- Dissatisfaction with lessons learned processes and systems: The comments included that 58 percent of responses stated that processes and systems did not allow them to retrieve the proper lessons at the right time. Managers indicated that not enough emphasis was being placed on reporting positive or successful experiences.
- Barriers exist to lesson learning: Comments included that 39 percent of program/project managers believed that implementing lessons learned contributed only some or little to improving mission effectiveness. Managers believed there was too little time for individuals to share lessons learned.

These are not unique to NASA, and the agency has made great steps (especially in subagencies like JPL, Goddard Space Flight Centre) since that review. This chapter addresses remedies for these issues.

## **Organisational Culture Challenges with Lessons-Learned Initiatives**

Despite seeing the value in learning from past experiences and mistakes, many organisations struggle to report lessons learned and to share these lessons and apply them. The AIDR (2019) found that:

“Not all organizations actively report lessons or share potential solutions with other organizations. Some of the reasons why sharing does not occur include:

- operational pace
- resource shortages
- time constraints
- a lack of understanding of the importance of sharing information
- a concern that doing so will open them to criticism or even litigation
- an assumption that lessons only relate to the organization internally
- an absence of processes that facilitate sharing.” (p. 13)

Too often, capturing lessons learned is seen as “extra work” – something over and above “the business of the business.” Some staff may ask for a billing code to do lessons-learned. Improving a business can happen in many ways. For example, it could be the introduction of a technological or market change which is decided by management and implemented in the organisation. But improvements coming from the lesson-learning – from internal sources – are by definition “evidence based” within the organisation, which makes them a priority and a less risky decision.

At the initial decision-making stage about lessons learned, there may be reservations within senior management. One of the fears is that they will be “airing our dirty linen” by exposing past mistakes and poor judgment. This sentiment is quoted in the AIDR Handbook as above and is echoed in this extract: “[There is an] unwillingness...to share information or air dirty laundry. If you made a mistake you might not be deemed to be a good project manager.” (NASA, 2001, p. 12).

The fear of being deemed incompetent is an understandable reaction, and there may be some basis for this fear. The lesson-learning system may be subjected to Freedom of Information requests in the public sector or become discoverable in a liability claim court proceeding. But then, the question needs to be asked whether the issues are also known and available from other sources. The plethora of dashcam, CCTV, mobile phone videos and images, as well as employee conversations, suggest that the lesson-learning system is far from the sole source of such content. Indeed, using the lesson-learning system and having the lesson included will show that the organisation recognises that something happened and is addressing it.

But the lessons learned regime needs to recognise the nervousness.

The World Vision experience (APQC, 2017b) illustrates a similar reaction at a lower level. Sarah Crass, the Knowledge Manager, was approached by a senior leader and asked to ensure that the knowledge management initiatives highlighted both the best practices and the learning that was coming from failure. To address the organisation’s fear of failure and to change mindsets, the KM team organized a global, virtual event called “Failfest.” Individuals challenged Crass about whether or not to embrace the word failure and felt it would clash with the culture, but she felt this was needed to truly signal the culture change required for the organisation to learn from failure. The virtual event garnered 13 submissions of lessons learned, but this only represented a fraction of the company. When reviewing responses and exploring the lack of responses, Crass found that many employees were concerned about the repercus-

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sions of discussing failures. In contrast, others were unsure of what should be submitted. Furthermore, individuals were fearful of their job security and the job security of their co-workers who were involved in the failure.

At the heart of these reservations is organisational culture. ISO 30400 defines Organisational Culture as “values, beliefs and practices that influence the conduct and behavior of people and organizations” (p. 7). One of the critical elements is trust. That is sometimes expressed as a culture where “safe fail” is tolerated indicating that personnel are encouraged to experiment and innovate. But most often it is used to convey an attitude of positive respect between management and staff, and between staff.

This trust element even extends to the use of language and following is a discussion of that in relation to lessons learned.

The worst possible phrase around lesson-learning is “we learn from our mistakes.” It should be true, but that expression alone will stop any lesson-learning initiative because it lays down and re-enforces a culture of blame (Gibson, 2018). Gibson conducted an experiment with several project teams on similar projects within the same organisation, using the “mistakes” nomenclature and the preferred terms (see below), and compared the quality of the lessons captured. An analysis of language in lesson-learning, and a change of approach shows a better response; co-operation and outcome are created when the language changes to “suggestions for improvement.” Very few project managers will be prepared to stand up in front of their team or their peers and say, “I made a mistake.” Whereas the author has found no opposition to saying, “we need to improve in the way we X.” This change of language seems trite, but it is powerful and essential for success. Furthermore, the focus on “improvement” paves the way for improvements (“positive lessons”) to be treated with as much attention and respect as “negative lessons.” The opportunity value of encompassing these may well exceed that of fixing problems. The preferred nomenclature for positive lessons is “Need to Sustain,” indicating strongly to senior management that a process/facility/tool was highly valued and contributed greatly to project success. The World Vision example (APQC, 2017b) above also illustrates the same challenge with using different language. As mentioned previously, big events may draw attention; but the cumulative effect (and value) of many small lessons add up remarkably quickly. Importantly, these smaller initiatives are often easy to implement and represent “low hanging fruit” and, therefore, an opportunity for success.

Trust is also crucial in the methodology for collecting lessons. The experience of the Victorian Country Fire Authority, which underwent a Royal Commission (Victorian Bushfires Royal Commission, 2019), is an example where a legalistic approach to gathering lessons had a significant adverse effect on the organisation and its staff. This was noted by the Victorian Bushfires Royal Commission (2019) itself:

*In reflecting on lessons learnt from this Royal Commission, the Commission notes that, unlike other state jurisdictions or the Commonwealth, Victoria does not have specific legislation that deals with the role, conduct and powers of a commission of inquiry. This lack of a legislative basis caused uncertainty, which the Commission considers undesirable. Arising from this, the Commission proposes that the State consider legislation for the conduct of inquiries—in particular, the conduct of royal commissions. (p. 32)*

Gathering lessons by interrogating witnesses, even with full legal representation, allowed the commissioners to get some insight; but the line of questioning suggested blame because of the legalistic context. People were demoralized by that process, some to the point of not volunteering information. When some incidents covered by the Royal Commission were revisited using an appreciative inquiry approach, the effect on the participants was much more positive, and interestingly, different lessons emerged.

Appreciative inquiry is an approach to organisational change which focuses on strengths rather than on weaknesses - quite different from many approaches to evaluation which focus on deficits and problems.

Different organisational cultures will value different outcomes and priorities. For example, the author was visiting an Oil and Gas company, discussing knowledge management and lesson-learning. In the field, they had experienced some poor practice which had cost them a lot of money, only to have the practice repeated with the same consequence. The frustrated client lamented the lack of support for his efforts at addressing the lack of learning. He pointed to a noticeboard in the foyer where the management interest in safety was shown, with metrics on lost time injuries, near-miss reports, etc. He then showed the author the forms on his desk resulting from a simple event of spilt coffee in the lunchroom.

The level of management engagement and company processes around safety was far in advance of the attitudes to improving the business through lesson-learning. In this case, the operational arms of the organisation had not achieved the same level of senior management engagement that had been successful with safety. To make improvements with lesson-learning within this organisation, the client will need an organisational culture and system that supports this learning for it to be successful.

### **What is the Actual Cost Involved in Collecting Lessons?**

The cost of operating a lesson-learning system is largely labour costs. These are of two types. Typically, one person in the organisation is responsible for coordinating lesson-learning, generally referred to as the Lesson Co-ordinator. This is seldom a full-time position and logically fits in the project management office (PMO) in a project-oriented organisation. The person coordinates the lessons coming in, progresses them to validation, etc., follows up with the assigned lesson manager to make sure they are checking on the progress of the action plan, and reports metrics associated with the system. Note that it is not this coordinator's role to drive the action plan; that is the task of the assigned Lesson Manager. It is the Lesson Manager's role to progress the assigned lesson through to completion. Generally, they will need to have a degree of authority in the organization to monitor and progress the various elements of the action plan; especially follow up on the individuals or groups assigned to the elements of the action plan. For example, a senior project manager from another project may be chosen.

Then there is the employee time at the After-Action Review (AAR) / Debrief / Review meeting. Typically, this is between one hour to one day, depending on the type of project. For example, an Agile project will do a review at the end of a sprint, so that may be short; but a major project may conduct a stage gate learning review which will take longer. The session needs to be led by an experienced facilitator and not the senior person responsible (who should be there to provide input). At this stage, the lessons are only being gathered, not analysed; and they should focus on elements that are likely to occur in the future. Note that AAR can be conducted at different levels in the project/organisation, and for process-oriented environments, they need to be scheduled events. Validation of lessons is done by a person who is a subject matter expert. There is some time to be spent here, but frequently this is what their role entails. As a typical example, a safety issue will be assessed by the Safety manager – which is their role anyway. So, staff time is the major ongoing cost of collecting lessons.

### **Lessons Unlearned**

In some cases, organisations capture lessons learned and may apply them, only to forget them later on. The Bushfires on Kangaroo Island report (CFS, 2020) included an analysis of the lessons learned from



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the previous 2007 bushfire on the island. It found that of those lessons previously collected and documented in the Lessons Management system,

- 17 Learned
- 46 Repeated
- 12 Not applicable in 2020
- 5 Unlearned

It is important to note that the author is not singling out the Fire Service here. Fighting major bushfires on Kangaroo Island is difficult because of difficulties in access, the large national parks, and restricted local resources. In the case of 2019-2020, the service was also fighting other major bushfires on the mainland at the same time. The author contends that this sort of analysis may well be duplicated in many organisations over time.

The repeated lessons from 2007 are probably due to the factors discussed in detail later in the chapter. Action plans were not completed to address the issues raised by those lessons as it was with the 17 successfully learned lessons. Of concern are the five unlearned lessons. These were Sustain-type lessons as per the previous use of nomenclature - things that went well in 2007 but were not sustained in 2020. It could be the case that insufficient attention was given to these sustain-type lessons in 2007, but in this instance, there was a knowledge retention issue. Between 2007 and 2019, there was a significant change of permanent staff in the area responsible for Kangaroo Island; and clearly, whatever fires the incoming staff dealt with were not on the scale of 2007 or 2019. Corporate memory had not been sustained, and this may contribute to the repeated lessons as well.

A strict quality-oriented approach would suggest that procedures had not been created, updated, or followed. In an ideal world, everything is transformed knowledge, made explicit in some written form. But actions are based on people knowledge, and within knowledge management, there are non-explicit ways of transferring knowledge, such as

- Peer Review
- Peer Assist
- Mentoring
- Communities of Practice

Having been to many debriefs/AAR, the conversations outside the formal session are often the most constructive; and in any medium-sized organisation, people learn, but not from a written procedure. The approach of fostering conversation is effective, often deliberately planned and caters for different learning styles and situations like “learning on the job”. Using facilitated conversations is also appropriate for small co-located groups. But following these practices as opposed to fostering explicit knowledge also places a responsibility on the organisation to pay attention to knowledge retention in a formal way. Otherwise, lessons will get unlearned – whether they are to be sustained or improved.

## ADDRESSING ISSUES WITH LESSONS-LEARNED

Having addressed some of the issues around management acceptance of lesson-learning, and the organisational culture factors that need to be in place to support lesson-learning, the practical problems associated with addressing the issues will be discussed.

There are real-world issues in addressing lessons. Lessons learned can be treated as a knowledge supply chain (Milton, 2018), and all the elements of good supply chain management applied to the lessons learned process.

Figure 1. Diagram of knowledge supply chain Source: author, 2021

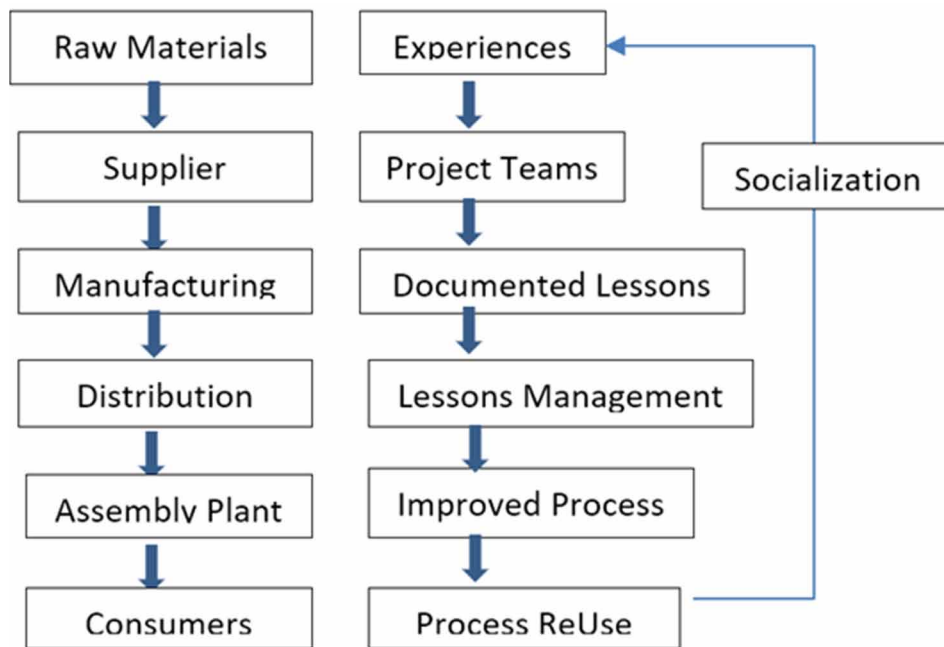


Figure 1 shows, on the left, a typical set of stages in a supply chain. On the right are the equivalent steps in the lessons-learning process. It starts with experiences gathered by project or operations teams and documented in AAR/ Debriefs. They then pass to Lessons Management, and from there, an action plan produces the final outcome back to the field, which invokes new experiences. This is labelled as Socialization in line with the SECI model (Nonaka, 1990).

There are two observed outcomes in this process that operate as the organisations move around the loop of activities.

**Outcome A:** The number of lessons at each stage decreases, each of which is a wasted learning opportunity.

**Outcome B:** The organisations' performance at the lesson learned function drops off.

An analysis of the reasons for these two outcomes follows.

## **Gathering Experiences**

Unless there is a culture in the organisation where experiences are valued, they will not be volunteered. Creating a learning culture or facilitating organisational knowledge as it is referred to in ISO9001 is not easy and requires constant re-enforcement. Moreover, past experience may deter people from sharing – either not being treated correctly in the past or simply nothing happening as a result of the report (Outcome A – fewer lessons).

It is not recommended to reward individual contributions because, in the author's experience, it leads to gaming and a significant number of low-value lessons while the high-value "hard" lessons are pushed aside. Experiences submitted need to be acknowledged and a reason established and reported if they do not proceed at this time.

One of the interesting features is the difference between the amount of information submitted when a person can voluntarily submit a lesson/experience and that coming from AAR / Debriefs sessions. Typically, volunteered lessons collect four times the amount of information, especially about context, when the lesson is submitted voluntarily. In a project team debrief, the context is "understood" and frequently not fully documented for use by other projects, but the main factor here is that the person volunteering the experience cares about the issue enough to report it, and they have time to do it.

By not allowing voluntary submissions (which still need to be validated) and relying solely on organised AAR / Debriefs, lessons will be lost (Outcome A – fewer lessons).

## **Documenting Lessons**

This is the process of recording the lessons – what happened, in what context, and what is the recommended action. When documenting lessons, this can occur at the stage gate of a project. When a team holds an AAR, typically, this will consist of a facilitator and up to about eight team members and take about three to four hours. The first step is to list the issues to be discussed or which have already been reported. Typically, there will be more than 20 items. In the session, there may only be time to discuss five. All items are recorded, but only five are fully documented (Outcome A – fewer lessons).

The most common method of documenting context is to record the lesson against a project. This is a simple approach at the Documenting phase, but the Validator needs to expand on the context in the next phase so that searching for the lesson is more effective, and future knowledge seekers can better identify the appropriateness of the lesson. For example – "This project was remote and in a foreign country."

The next issue is to ensure that the lesson observed is framed for the next/other projects. This can be difficult in isolating customer-driven issues; to decide if there is a general outcome. For example, stakeholder engagement may have been poor because six different people represented the client over the stage– it may be a specific client problem. Still, the lesson may be to intervene earlier with the stakeholder to ensure continuity. There may be organisational pushback to being aggressive with a client (Outcome B – poorer performance).

## **Lessons Management**

Lessons management is probably the biggest area of lesson-learning failure. Too often, lessons are recorded on a spreadsheet – and left there. Some project-oriented methodologies include the need to keep such a register – without any requirement for action. (Outcome B – poorer performance). It is also noted that frequently lessons “drop off” the various spreadsheets (Outcome A – fewer lessons). As mentioned earlier, Knoco’s surveys indicate the most gain in the effectiveness of lessons learned is associated with a purpose-built lessons learned system.

There is also a common approach where, at project initiation, the project manager is supposed to review all previous, appropriate lessons for the upcoming project. Based on observations in the field, if this is done, it is often cursory or haphazard. (Outcome B – poorer performance). A major contributing cause is that project initiation is a hectic and complicated time for project managers.

Another issue is lessons being collected too late in the project (Outcome B – poorer performance). Memories have faded, particularly the issues from the start of the project, and will be biased towards the later events. But a more significant issue is that staff get re-deployed off projects progressively and need to be present to contribute to the AAR/Debrief. Recalling them or contacting them using technology is not always possible or appropriate. The major problem with conducting the review at the end of a project is that recent progressive experience does not make it through the system in time for new commencing projects. Projects should collect lessons at a stage gate or Agile sprint. Process organisations need to schedule a regular review.

The recommended approach is to use lesson-learning applications to collect all lessons (no matter what their status), to progress the lesson through validation by a subject matter expert to verify the content and context and to identify the root causes, to prepare an action plan; and to progress the completion of that action plan. Few organisations take this recommended approach (Outcome B – poorer performance). In terms of validating root causes and forming action plans, it is relevant to consider that in organisations now:

- Most effects involve multiple factors.
- Processes and responses are no longer linear.
- There are too many inter-relationships in our business that we seldom understand.

So, considering all implications of a lesson and its subsequent action plan, the next steps are not simple. (Outcome B - poorer performance)

During this phase, a large number of lessons need to be prioritised. Typically, this is done by risk / opportunity rating, and/or value (gain/loss in association with the parameters in the taxonomy). The taxonomy is the various categories used to classify the lesson such as type of project, area of technical expertise, geographical region etc.

Using the taxonomy in the ranking is important in that a lesson with the same risk rating for project teams should be ranked higher than a lesson for the Human Resources department; because of the value associated with the lesson. The ranking will inevitably lead to some lessons not progressing (Outcome A – fewer lessons).

In looking at various clients, the taxonomy seems underdeveloped. The coding against the taxonomy will be fundamental to search, so the coding should be as detailed as possible and done during the validation process. Multiple values against a category are most useful. The author has experience where a

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particular value was never the top choice in a category, but when the category was analysed, the value was present in a large number of cases – and this resulted in a lesson and action plan to address the issue.

## **Action Plan**

Once the lessons are identified, documented, and added to the lesson management system, an action plan must be created to deal with the lesson. ISO30401 Knowledge Management's definition of lessons learned included a note about a change in behaviour. This was reinforced in the ISO30400 Revision, where the definition now reads "changes in *behaviour* as a *result* of *learning* or of recommendations from experience" (p. 28). Without a change in behaviour, all that remains is a "lessons identified" regime. An action should result in a change to a procedure, or training course, or training which must be delivered. (Outcome B – poorer performance). Moreover, the action plan should be directed at the situations as they will arise in the future, not just the context where the lesson occurred originally.

Once again, not all lessons will have these prepared; because once the plans are done, there is an implied commitment to doing the actions. (Outcome A – fewer lessons). Often actions are generalised ("people need to be more careful"), incomplete in their coverage (only directed at the reported context and missing other areas for improvement), or have other issues; but the most common failure is that the action plan is not directed at permanent change (Outcome B – poorer performance).

## **Challenges with Action Plans**

The action plan is the biggest area for drop-off in lessons (Outcome A – fewer lessons) and poor performance (Outcome B – poorer performance). Put simply, the organisation does not have the capacity to implement all the action plans identified. This is legitimate. Devoting operational effort and resources to improve on top of business as usual is a senior management decision and policy – and not an easy decision. But the whole point of a lesson-learning regime is to feed this improvement, and the decision to have such a regime implies a commitment of resources to implement (at least some of) the action plans.

There is often some discussion about the need to include a Benefits Realisation step in the action plan. "Prove that the lesson has been learned" is a common comment, but this is problematic because the cost of doing that may outweigh the cost of the action plan itself. Besides, if the lesson has been learned, there will be no indication.

What may happen is a "repeat lesson." These must be recorded (again) and go through this same examination and validation. Typically, reasons for a "repeat lesson" are:

1. The action plan was never drawn up.
2. The action plan was never implemented (see below).
3. This is a different context that was not covered in the action plan.
4. The action plan was not complete.  
(All of these are Outcome B – poorer performance)
5. Non-Compliance.

Non-Compliance is a regular issue. It means that the organisation does have a lesson to learn but the rules were not followed. In that case, the root causes and ensuing action plan for the "repeat lesson" should be directed at discipline. A common factor influencing the acceptance of a lesson is the NIH

(“Not Invented Here”) syndrome. Project Managers may claim, “I would never make that mistake....” and proceed to do just that or a variant of it. If a unit has been given a lesson that they feel is not appropriate and that is borne out by evidence, then the way that unit successfully handled that issue becomes part of the action plan. In improving their lessons learned process, NASA (2001) recommended that:

*If it [lessons learned] is important then make it important. Give it the processes, procedures, resources, and particularly [the] time, to make it a positive experience. However, merely making it another requirement to an already overwhelming work schedule will doom it to the failure it presently may be experiencing. (p. 14)*

The previous quotation from the AIDR Handbook (AIDR 2019) used two items illustrating the reason for lessons are not learned:

- Lack of resources
- Lack of time (p. 4)

Lack of resources is an often-quoted reason. This will be discussed later, but independent analysis can often indicate where a few resources could have been deployed to partially or substantially address the issue, but the management priority on the allocation of those resources did not see the priority in addressing the lesson. To some degree, this is a risk assessment, which will be discussed later.

Lack of time has some overlap to the reasons for staff not being available to collect lessons in the first place, but there are strategies to overcome the time factor. One is to establish a timeframe for a solution against the lesson. As an example, a three-stage approach may be useful:

- Must be addressed immediately – within the project.
- Must be addressed in the training of the next project.
- Longer term.

While simple, this draws attention to the first two categories above and may represent a usable framework for setting an expected completion date.

Conducting a Benefits Realization exercise on lessons learned is problematic. Such an exercise is designed to assess the changed state after the action plan is complete to seek out evidence that the lesson has, in fact, been learned. They are expensive to do completely, and proving that a lesson has been learned without a direct re-occurrence of the same or similar event in the same context is difficult.

In the author’s opinion, the fact that BAU (Business as Usual) does not include the capacity to improve is the major organisational cultural problem at this time. Incidental surveys conducted informally suggest that only about 30%-40% of organisations possess the capacity to improve in BAU. This also affects other attempts at continuous improvements, such as quality initiatives.

## **Back to the Users - Socialization**

The section above mentioned changing procedures, training, and so forth. There is an observed problem with the way in which lessons are communicated (Outcome B – poorer performance). Bulletins tend to be verbose, including too much background rather than concentrating on the call to action. This is “push”

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knowledge management. “Pull” knowledge management consists of the bulletins (and the underlying lesson) being available in search. These are still subordinate to the actual changing of processes, training, and so forth.

Often there are no procedures to be updated. A good example is that many project organisations do not have an internal Project Management Body of Knowledge (PMBok) as envisaged by the creators of that body of knowledge. Often there is no documented procedure on “How we do projects,” which the Project Management Body of Knowledge was designed for.

The best examples of Socialization the author has seen involved a Kaizen style A4 sheet, supported by videos on the Intranet. In that case, the video presenter is the youngest member of the team involved in the original incident. The thinking behind that move is to appeal to the younger staff members to treat the lesson as a relevant lived experience, with the backup of possibly initiating a new subject matter expert. While at a conference or webinar, we may want to hear from the best expert available; in lessons learned, the Socialization step in the process above is much more focused on adoption and relevance.

## Measuring Success

As with all knowledge management initiatives, this process needs to be supported by metrics; and a sample is provided below. This is taken from the Lessons Management Hub (LMH) software package created by the author.

Figure 2. Sample metrics report from lessons learned software Source: LMH 2021

	No of Lessons	Closure rate	Annual Value	Days to Draft	Days to Validated	Days to Actions Assigned	Days to Completed	End to End
Boiler and Process	4	25%	\$41,710,400	60	45	40	171	316
Global Service	5	0%	\$14,400	43	58	78	1	1
				9	9	7	1	1
<b>Total Lessons</b>	<b>9</b>	<b>11%</b>	<b>\$2,084,823</b>	<b>51</b>	<b>52</b>	<b>56</b>	<b>171</b>	<b>316</b>
				9	9	7	1	1

This report (Figure 2) shows, for two business units, the number of lessons reported, the percent which have been taken through to completed actions, and the projected annual value of those lessons. The figures in the second line in each case are the number of lessons that completed each stage. There are also several time-related metrics. Days to Draft, for example, is the elapsed time between the event and the lesson being completely entered into the system (with supporting documentation). Ideally, the event should be documented in less than 30 days (while memories are fresh). The two units have taken different elapsed periods in each stage, and Global Service has not yet completed all the actions on any of its lessons.

Outcome A: Fewer lessons are clearly visible in this report.

## **What can Knowledge Managers Do?**

The focus must be on changing behaviour (completing the supply chain). That means that an effective regime must be in place and complied with. This chapter outlines a best practice approach. The key players are the project teams, for they must see value in the process, so celebrating the use of a previous lesson needs to be broadcast widely. The Knowledge Manager needs to be working with the project teams to ensure that they benefit from the prior experience; before asking them to contribute to the future. Examples of failing to learn from previous experience will be relatively easy to find. They need to be brought to the surface without casting blame.

## **FUTURE RESEARCH DIRECTIONS**

Organisations are under increased stress to perform efficiently and to deliver value to their customers. A lessons learned initiative helps organisations deliver continuously improved results. However, many organisations struggle to implement these processes, and those that do, often struggle to show results from these processes. Available case studies of how organisations have successfully implemented lessons learned already provide valuable lessons for organisations to leverage and improve their own practices.

Future research needs to focus on the management level thinking which does not recognize the benefits of lessons learned to the extent of supporting such an initiative. There seems to be some sort of disconnect as outlined earlier.

Another area of investigation is to identify why so many organisations start a lessons learned initiative; do not support or complete the process as outlined in this chapter; and do not proceed.

Both sets of research are very much people related.

## **CONCLUSION**

“There are lessons observed; not learned” still rings true. In some cases, lessons are not progressed for legitimate priority reasons, but most often they lack a defined and mature Lessons Management System, leading to the organisation failing to learn. A primary organisational issue is the establishment of an appropriate lesson-learning regime, practice, and toolset.

Having defined the lesson in the Lessons Management System, in the vast majority of cases covered, the failure of the lesson-learning regime to handle a reasonable number of the more serious lessons is due to organisational issues. Major organisational cultural issues prevent effective lessons learning, from nomenclature at the base level to trust issues to organisational focus on the importance of becoming a learning organisation. But a major factor emerging is that BAU (Business as Usual) does not include the capacity to improve. This cultural and management blind spot, even if self-justified as being related to a pandemic, is a recipe for an organisation that will fail to thrive in the future.

Finally, it must be said that despite all the issues and problems outlined in this chapter, establishing and using a lessons-learned regime as outlined, however imperfectly it may be used, will generate a significant return on investment. The issues are not an excuse to refuse to learn.



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## **KEY TERMS AND DEFINITIONS**

**AAR/After Action Review/Debrief:** A method for identifying risks and addressing them, based on existing lessons and knowledge. Note: It is recommended to stretch AAR's scope to include identifying and addressing opportunities as well.

**Knowledge:** Human or organisational asset enabling effective decisions and action in context.

**Knowledge Management:** Management with regard to knowledge.

**Lessons Learned:** Recommendations for future behaviour and comprehension based on learning thorough debriefing or knowledge capturing processes of previous activities.

## ***Why Do Lessons Learned Often Fail?***

**Note 1 to entry:** A Lessons Learned is completed when there is an identified change in behaviour in the organisation as a result of the lesson.

**Lessons Management:** Is an overarching term that refers to collecting, analyzing, disseminating and applying learning experiences from events, exercises, programs and reviews. These learning experiences include those that should be sustained and those that need to improve. The goal of this activity is ongoing improvement by organisations and the people who work for them.

**Organisational Culture:** Values, beliefs, and practices that influence the conduct and behaviour of people and organisations.

**Organisational Knowledge:** The organisation shall determine the knowledge necessary for the operation of its processes and to achieve conformity of products and services. This knowledge shall be maintained and be made available to the extent necessary. When addressing changing needs and trends, the organisation shall consider its current knowledge and determine how to acquire or access any necessary additional knowledge and required updates.

**PMBok:** Project Management Body of Knowledge: Project Management Institute. This publication details the desired methodology for managing projects of all sizes and types, now in its 6<sup>th</sup> edition.

**Taxonomy:** This is a scientific classification system (for example, botany). In this context it is used to describe the properties, attributes or parameters that are associated with a lesson to categorise the lesson. It is used for search and reporting.

# Chapter 11

## Facilitating Organizational Change With Knowledge Management

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### **ABSTRACT**

*This chapter will describe methodologies and strategies that can help knowledge management, business development, and other change-making professionals drive organizational change leveraging a knowledge management approach. It describes an end-to-end methodology to drive change with a combination of knowledge management methods. The methodology is structured in five steps: setting up transformation teams, discovering in-house knowledge, creating internal capabilities, facilitating experimental execution, and impact evaluation. Issues discussed in the literature review include the nature of organizational change, why organizations change and how, the need for innovation, why organizations resist change, and how knowledge management facilitates organizational change.*

### **INTRODUCTION**

It is an exciting time to be in a change-making role in business. The digital technology boom of the 1990s and 2000s has resulted in the continuous innovation and transformation of the way business is conducted. There are urgent global priorities that exist beyond the implementation of big data and artificial intelligence technologies, such as gender equality or environmental sustainability, that pose both challenges and opportunities to even forward-thinking firms. Furthermore, generational and cultural change, new employee expectations and ways of working, and the impact of the global pandemic are radically transforming companies.

In a context of rapid change, knowledge management (KM) is a key element in an organization's strategy. Knowing what, how, and when to change can determine the viability of a company. The increasing size of the digital transformation consulting market in 2017—\$23 bn globally, representing 15% of the entire consulting market—is an interesting measure of the complexity of today's business

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environment. The size of the global management consulting market belies how companies are trying to resolve these challenges by seeking external knowledge. More significantly, it displays how established companies are not trying to tackle the challenge of evolution by looking within their organizations and building on their existing knowledge.

Companies often mistrust or simply ignore the amount of knowledge they have within their organization. While worker know-how is touted as a desirable quality, most of the time it is not captured and made retrievable—it only resides in the minds of those employees who have it. The expertise remains invisible to the company and, when needed, companies cannot access this in-house knowledge. When internal knowledge is ignored, the risk of making bad decisions may increase, because external solutions or operating models may not be a good fit for the organization's culture.

KM's objective is to unleash the value of internal assets, but generating the consensus needed to implement a knowledge management capability is not an easy task for several reasons. One is that employees may lack motivation to share their knowledge. The available options for a technology stack are ever changing. Moreover, available KM applications frequently lack accessible user interfaces, and there are insufficient metrics for the utility of KM practices. Given the ease of hiring outside consulting firms and the difficulty of finding, classifying, and disseminating internal knowledge, KM projects infrequently manage to transcend brainstorming sessions and become actual. This is why practitioners highlight the importance of internalizing knowledge management into the organization's culture.

Internalizing knowledge management may improve the coordination between human resources (HR), IT, operations, and business development departments, taking the best practices and priorities from each, and putting together tools and methodologies to facilitate information sharing. Note that this is different from having a knowledge management department—the process of implementing KM strategies may lead to a centralized department, but effective knowledge management must be broader than a departmental task.

## **BACKGROUND**

Knowledge management is most necessary in a context of change, thus the literature review presents issues related to why organizational change happens. It dives into the issue of open innovation, a widely recognized approach to organizational change that highlights the need for collaboration. It reviews contributions in the KM discipline that point out what the role of KM capability may have.

### **Organizational Change, Exogenous or Endogenous**

Organizational change is what an organization does to adapt to a changing environment and survive. Change can occur at different levels: a change in the mission and strategy of the company, a change in the leadership team, in the organizational design, or in the technology, to name a few. Forces both external and internal can affect change. Examples of contemporary external change that push companies towards deliberate organizational change include the advancement of technology, a changing workforce, competitive pressures, and globalization (Burnes, 2004; By, 2005; Kotter, 1995).

Change can be conscious or unconscious, managed or unmanaged, and above all, it can be successful or unsuccessful. This chapter addresses the implementation of disruptive corporate strategies, which

is defined as organizational change that is planned as a conscious effort to adapt the organization to a specific context, in line with Stouten, Rousseau, and De Cremer (2018) and Harigopal (2007).

Regardless of intention, conscious effort, or deliberate management, organizations often struggle to create meaningful, sustainable changes (Stouten et al., 2018). Heracleous and Bartunek (2021) argue that organizational change failure occurs when expected outcomes of change have not been met. Failure is a consequence of inattentiveness to deep structures and temporality.

Planning for organizational change requires a holistic approach that incorporates context, agents, culture and rules, and processes. Context is a key element in organizational change. Pettigrew's (1990) contextualist approach to the study of change in organizations is illuminating. Pettigrew recognized that change is multifaceted, and elements such as power, chance, opportunism, and accident are as important as design, negotiated agreements, and master plans (Pettigrew, 1990).

For some theorists, change is possible when there is a window of opportunity (McCarthy et al., 1996). Critical junctures can occur when exogenous and endogenous changes occur simultaneously. Mahoney and Thelen (2010) and Collier and Collier (1991) underline the long-lasting effects and legacies of decisions made in a critical juncture.

McCallum, Vasconcelos, and Norman (2008) emphasize the role of leaders and state that their influence has a significant impact on the operation of the organization, and therefore there is a strong behavioral element in how organizational change occurs. Tabrizi (2014) argues that the key to change is middle management. Contrastingly, Pascale and Sternin (2005) underline the importance of companies' secret change agents; those individuals in an organization who are already doing tasks in a radically better way, but are not part of the executive management.

The mindset and culture of those who define a desired change sets the direction and ambition of the change. One of the most recognizable arguments for the importance of mindset is Beck et al.'s Agile Manifesto (2001), which is the expression of an open mindset that aims to build resilient teams capable of learning continuously from their delivery. A culture that favors experimentation and learns from failures is more resilient.

Institutions, rules, processes, and organizational structures also play a role in organizational change insofar as they define agents' behavior. Decisions made in organizations are dependent on decisions, experiences, and organizational arrangements made in the past. This path dependency reinforces certain dynamics within the organization and prevents others (Pierson, 2004). In fact, change can be framed as a gradual overlapping of successive arrangements that survive or are replaced by new ones (Mahoney & Thelen, 2010).

## **Open Innovation also Requires Internal Collaboration**

Broadly speaking, innovations are the cumulative changes organizations have made to survive in a competitive environment. In more traditional business environments, innovations may come primarily from internal processes. In the contemporary context, most businesses engage in the process of change in an open innovation environment.

Open innovation is a radical shift in the mindset of decision makers that is changing how organizations generate innovation. Chesbrough and Bogers (2014) explain it is a process "based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model" (Chesbrough & Bogers, 2014, p. 17). Companies must cooperate even with competitors to attract knowledge through partnerships and collaboration, rather than

exclusively competing with one another. They are often forced to make quick decisions about complex technology issues without clearly understanding their implications.

“Coopetition,” a portmanteau of cooperative competition, stresses the importance of simultaneously collaborating and competing to improve the creation of value. The term also has an intra-organizational dimension that questions non-collaborative practices (Padula & Dagnino, 2005).

Open innovation does not operate exclusively inside the firm—it includes creative consumers (Berthon, 2007). In essence, it is a paradigm that assumes firms can and should use both external and internal ideas, and internal and external paths to market, as they seek to advance their technology. West and Lakhani (2008) support Berthon (2007) by positing that open innovation models rely heavily on communities of user innovators. These communities operate outside the boundaries of a firm, have self-governing principles and structures, and form a space where individuals and firms can co-exist and create new value. These communities, much like the larger open source movement, have gained attention for their “novel collaboration, problem solving, and intellectual property practices” (West & Lakhani, 2008, p. 9). Such innovation environments can be preferable in what Ismail (2014) calls *exponential organizations*. These are a specific class of firms that can grow and scale faster and cheaper than their peers by leveraging their user communities, big data, and technology.

### **Knowledge Management Ensures Consistency**

KM encompasses processes and systems that effectively put required knowledge into the hands of those who need it, when they need it. For Davenport (1994), it is the process of capturing, distributing, and effectively using knowledge.

KM aims to link explicit, implicit, and tacit knowledge, and to make it searchable, accessible, interoperable, comparable, usable, and actionable by practitioners that may be in need of specific knowledge (Bennet & Bennet, 2008). Perhaps the most comprehensive definition is “knowledge management as a discipline and a practice” (Koenig, 2012). As discussed by Ackoff (1989, p. 4), information is a sub-element of knowledge. Ackoff defined knowledge as know-how, or what makes possible the transformation of information into instructions. He differentiates between information of data, information, knowledge, and wisdom, and argues that data is “raw” and simply exists in different forms, while knowledge is conveyed by instructions and answers to how-to questions (Ackoff, 1989).

Henry’s (1974) seminal work about knowledge management and public administration describes how new technological and decision-making uses of information affect outcomes, as well as public policy. Information of any kind is a key element in moments of change.

The first stages of KM were driven primarily by IT departments, and later linked to human resources and corporate culture departments, and then, to content management (Koenig, 2012). New theories, such as social physics, suggest that knowledge management has a great potential tie with workplace analytics and business intelligence in general (Herschel & Jones, 2005). Social analytics, as defined by Pentland (2014), can reveal where ideas come from and how they are put into action, and use that information to create productive and creative social structures.

Before its emergence as a skills area deserving of its own title, knowledge management personnel operated under various monikers, i.e. knowledge managers, analysts, and specialists. In the early 2000s, the role of Chief Knowledge Officer became popular (Dalkir, 2013). However, this role lost traction and was soon overshadowed by other roles such as Chief Information Officer (CIO) or Chief Data Officer (CDO).

There is some debate in the literature regarding the proper designation of knowledge management's role in organizational structures. Some authors refer to KM programs, rather than departments (Garfield, 2007). More recently, Lauria et al. (2014) defined knowledge management as an operational risk mitigator, understanding operational risk as "the risk of loss arising from inadequate or failed internal processes, personnel, or systems, or from external events" (Lauria et al., 2014, p. 12). KM is a key driver of organizational performance because it leads to a better use of a firm's internal resources (Sayyadi, 2019).

For other authors, knowledge management is a culture. KM is the result of what practitioners do—to reflect and learn from their day-to-day experience and share with their peers in communities of practice (CoPs)—communities of professionals who share a common interest and desire to learn from and contribute to the community with their variety of experiences (Lave & Wenger, 1991; Schön, 1984). KM is the outcome of a practice, but also the result of underlying values such as recognition, meritocracy, professionalism, and responsibility. Thus, for a KM program to be successful, employees need to adopt the KM culture (Milne, 2001).

Communities deserve a special place in this review because they are the enablers of organizational change. The relevance of CoPs has been highlighted in the literature on countless occasions, but relating to organizational change, other types of communities may be more appropriate. Draghici et al. (2008) talk about communities of position, interest, action, and purpose. In this chapter, it is argued that employees who are knowledgeable and motivated by the spirit of innovation and change proposed in the corporate strategy should be summoned to a joint venture under the structure of a community of purpose—the purpose being the mission of the corporate strategy itself.

## **THE NEED TO INTERNALIZE KNOWLEDGE MANAGEMENT**

Because organizational change is multifaceted, and open innovation also requires intra-organizational collaboration, it is surprising that many companies still do not invest in knowledge management practices, and most KM professionals operate either independently or within consultancy firms. For decades, business discourse has stressed the importance of know-how, experience, and coordination, yet it cannot be affirmed that knowledge management is a generalized practice within most companies.

Consider the management of fundamental assets. If a company did not have clear financial management processes or a system of record for clients and customers, they would face imminent demise, because these are fundamental assets. Modern companies need reliable access to their own internality, from company culture to customer analytics, especially as they scale up or embark on transformative projects. Viewed this way, knowledge is a fundamental asset that every company needs to be sustainable.

An internalized KM discipline is constantly operating programs to collect information using various techniques, from statistical analysis to ethnographic interviewing to archival research. From this, it organizes the information, generates meaning from it, and most importantly, disseminates the results. An internalized KM department can provide the following assets:

**Capture the tacit, implicit, and explicit knowledge of the organization.** KM intervenes to capture and systematize lessons learned from each project to render them permanent, fungible, and useful. **Make knowledge accessible, comparable, and interoperable.** Once transformed into tangible products, such as documents, databases, presentations, and other formats, knowledge must be gathered in



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one place and classified to be findable and reusable. KM consolidates, sorts, and opens access to this information.

**Teach operational knowledge to empower employees.** Organizations invest a significant amount in training their employees, typically by outsourcing the task to corporate education firms. When knowledge is documented and accessible, organizations can draw on their own history to generate in-house training and reference materials.

**Support innovation.** KM offers a rich catalogue of methodologies to capture, reuse, and continuously improve in-house knowledge, support operations teams, reduce learning curves, and adopt innovative approaches. Well-documented knowledge becomes more robust as it is collected, analyzed, and distributed, enhancing the capacity of the company's financial, talent and capital assets to find new business opportunities and innovations.

## **Knowledge Managers in Transformation Teams**

Departmental silos are commonly identified as major obstacles in change-making projects (Bundred, 2006). They tend to create allegiances and fiefdoms within an organization, and at their most dysfunctional, they may engender rivalries, secrecy, and resentment. While departments will still be a necessary organizational form in the 21st century, some of the isolation they enable can be avoided with the implementation of communities of purpose (CoPs). These groups operate in an interdepartmental manner and consist of employees collaborating on a common issue, i.e. a transformation plan. The CoPs share challenges and expectations regarding the transformation project and provide context across their departments for one another.

CoPs are highly elastic across multiple dimensions. The scope of the project defines the scale of its CoP, and members may join and leave as the project requires. They may consume more resources or effort during certain phases of the change; for example, an upskilling CoP may need increased capital investment or access to employees' time during the capability-building phase. In change-making instances, this allows for agile and responsive working practices. The KM team holds responsibility for determining what is needed of a CoP at all phases of the transformation project, and coordinates with departmental management to ensure their natural flow.

With a transformation team at the helm and relevant CoPs in place, the process of transformation can commence. These groups will continuously feed one another information and directives, and their interdependence is paramount. KM professionals ideally have core competency in facilitation, thus can provide appropriate channels for such an exchange. Ultimately, the firm is building a synchronized fleet of workers driving together towards the transformation objective.

## **SOLUTIONS AND RECOMMENDATIONS**

This chapter describes methodologies and strategies that can help knowledge management, business development, and other change-making professionals implement successful internal transformations. It describes the entire process of change in five phases, summarized in Table 1.

The first phase is to create a transformation team, with a KM role as the main facilitator. The second phase is discovery and scope. In this phase, the organization maps its own resources and clearly describes the nature of the project. The third phase is the capability building phase wherein the work-

force is brought up-to-date and into the process of organizational change. This approach marks a subtle but crucial shift towards worker-focused solutions, better ensuring real results. In phase four, a pilot program is launched with a particular focus on agile design thinking, and incorporating an inventory of the company’s knowledge into project and product design. The chapter concludes with a discussion of the fifth phase, measuring impact, which describes knowledge management’s role in best practices for evaluation and iteration of a program. The last section covers reflections about the importance of dissemination and communication.

What ultimately sets this transformation methodology apart from other innovation strategies is the emphasis on connectivity and the living, moving efforts of the workforce. Too often, KM projects are embedded solely within IT and technology departments or within human resources, but here, knowledge management is necessarily more encompassing than just another technology solution or workforce upskilling initiative. It is a project of capability mapping and building that expands past training and leverages the talents and wisdom of the organization’s workforce to find processes that are more effective.

Additionally, the evaluative aspects of this strategy imply cyclical innovation. Any implemented transformation project may be linear, but it is the evaluation phase that leads to subsequent innovations. Ultimately, the goal is to empower decision makers to drive innovation in a way that is tied to the history, culture, and knowledge of the workforce that creates a virtuous cycle of growth and positive change.

*Table 1. A summary of the methodology’s phases*

Phase	Sub Phase
Step 1	<b>Setting Up a Transformation Team</b>
Step 2	<b>Discovery and Scope</b> , includes: <ul style="list-style-type: none"> <li>· Knowledge Mapping (Discovery)</li> <li>· Opportunities and Challenges Identification (Scope)</li> <li>· Planning Resources, Roadmaps, and Defining Action Plans</li> </ul>
Step 3	<b>Capability Building</b> , includes: <ul style="list-style-type: none"> <li>· Workforce Upskilling, and Reskilling</li> <li>· Documented Infrastructure, Data, and Algorithms</li> <li>· Defining Roles, Organizational Structures, and Business Processes</li> </ul>
Step 4	<b>Pilot Execution with Agile and Experimentation</b> , includes: <ul style="list-style-type: none"> <li>· Why knowledge management is important in agile</li> <li>· Facilitating an Experimental Business Environment</li> </ul>
Step 5	<b>Measuring impact through Knowledge Analytics</b>

## **Step 1: Setting Up a Transformation Team**

There are many obstacles on the path to meaningful change, and gaining adequate buy-in is crucial to ensure the end-result is something with which all are pleased. This is the first task of a KM program in change-making processes: aligning expectations and organizing disparate departments to work towards the shared goal. Table 2 is suggestive of the role of key departments in a transformation.

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Table 2. A summary of the transformation team's responsibilities

Human Resources	The HR department's role is to lead in expertise location, external hirings, career development, and learning itineraries for current employees, organizational design, and learning acquisition evaluation.
Lines of Business	The lines of business lead the definition and prioritization of the project portfolio, ensure the execution of projects, and perform the business impact evaluation.
IT & Operations	The IT and Operations Departments define the tech stack that is most appropriate to fulfill the business needs and match the skills of the employees.
Knowledge Management	The Knowledge Management Department leads the execution of the project, facilitates the conversation between the other parties, ensures the quality of information, manages the transformation group community of purpose, and ensures the documentation of lessons learned.

### Step 2: Discovery and Scope

After the formation of a transformation team and a transformation CoP, the first phase in the transformational process is to discover existing in-house knowledge and develop a project portfolio containing specific action plans. Mapping internal knowledge and reflecting upon what is available in-house constitutes the beginning of this phase. It is structured in two parts: Discovery and Scope.

Discovery's goal is to capture an accurate and thorough portrait of the organization prior to the change process. Taking this assessment project seriously and engaging honestly with what is uncovered, is critical to the success of a transformation project as it grounds the transformation team in the reality of the company's current capabilities. Only through a thorough Discovery process can the Scoping of the transformation project succeed in defining useful movement towards the objective.

#### Knowledge Mapping (Discovery)

As much as a company may know itself, there are often surprise caches of knowledge and capacity that are found through the process of inventorying. While there is inevitably some need to incorporate new information and capabilities into the organization before setting about to market for new technologies or employees, it is useful to determine what already exists internally. The basic objective in this phase is to define knowledge capture forms that can support continuous, organization-wide knowledge collection, and systematization.

As university research benefits from its diversity of methodologies and measurements, corporate knowledge management benefits from a diversity of forms of information capture. Table 3 depicts the necessary (but perhaps not sufficient), elements of a successful knowledge inventory.

Knowledge management departments should have the technical capacity to clean, quality check, classify, tag, store, and maintain the knowledge inventory they create. These skills will be crucial for later phases of the change-making process, particularly during capability building. While companies will all have their own idiosyncratic systems of record, functionality and attention to accessibility must be central in its design.

Once these inventories are in place, the organization must implement programs to engender their dissemination. Instrumentalizing the transformation CoP can be a great approach. The knowledge inventory can be made available to its members, who can then instrumentalize the captured knowledge in determining what must change for their piece of the larger project.

*Table 3. A summary of the knowledge inventory elements*

<b>Project Portfolio</b>	The project portfolio is a catalogue of past and current projects. Project descriptions should include a description of the background of the project, the analytical framework, results, and potential spin-offs that may emerge from that particular project.
<b>Lessons Learned Inventory</b>	Lessons learned can be defined as knowledge acquired about a process or one or more experiences, through reflection and critical analysis. Documenting, systematizing, and sharing the lessons learned among the different teams helps avoid design errors, improves execution capacity, shortens learning curves, and improves the quality of products and services.
<b>People Directory</b>	The people directory indexes employees' specific skills and knowledge required of the transformation objective. People are catalogued by professional profiles with contact information, skills, connections, and work history.
<b>Technology and Code Inventory</b>	The technology inventory is a list of applications, algorithms, spreadsheets, and other useful digital tools that address specific challenges related to the transformation objective.
<b>Data Catalogue</b>	The data catalogue is a list of data sources that can be used to support the analysis of the transformation project. It contains a list of all published tables with a description of their contents, the responsible department, the update frequency, the number of times that has been visited, the technical information to connect it with computer applications, and a space for user comments and quality evaluations.
<b>Skills inventory</b>	The skills inventory is a catalogue containing a skill map that also determines how skills relate to each other. Skills tags are used to categorize employees, datasets, learning courses, and other elements of the knowledge inventory.
<b>Course Catalogue</b>	The course catalogue is an organized collection of training activities and materials that are relevant for the purpose of the transformation plan.
<b>Technical Documentation</b>	The technical documentation section should include guides, protocols, and manuals that help practitioners do their job and developers understand the architecture and code of the digital tools.

## Opportunities and Challenges Identification (Scope)

From the Discovery insights comes Scope planning and goal setting. At this point, the knowledge inventory has made tacit knowledge explicit, and made explicit knowledge centralized. A more complete picture of the elements of the firm has formed, and the transformation team can now begin to brainstorm realistic paths to the desired transformation objective. The product of this phase is a depurated project portfolio containing initiatives informed by the knowledge inventory and aligned with the vision of the transformation objective.

The transformation objective may be somewhat amorphous up to this point, in the form of some value (e.g., “all our processes will become more environmentally sustainable”) or business opportunity (e.g., “we must use customer data more effectively”). The executive team must now revisit these initial attempts at transformation to better define their ambitions. Desires are shaped into goals through the application of the company’s knowledge inventory, which illustrates both the potential and potential constraints that will inform the nature of the project.

At this point, the diversity of the transformation team’s viewpoints becomes a strong asset. The next three to five years of company strategy may be determined in this phase and, thus, it is important to draw upon the various forecasting strengths of individual departments. Some gentle facilitation by the KM department is useful for maintaining alignment of goal setting in this phase, as its supra-departmental viewpoint can weave together the capacities of the organization and facilitate insight into growth areas.

## Building Personas

Obviousness aside, the fact that work is done by workers can be overlooked by transformation practitioners. Even in an age of rapid technological growth, no amount of sophisticated data collection programming will operate itself, thus transformation must center on the workers. In the Scope phase, this is manifest by building personas. Personas are avatars of the ideal workforce—their skill sets, attitudes, personal characteristics, and their knowledge. Building personas foregrounds the activity and experience of work and illuminates gaps that lie between the current and optimal state of the business.

By determining what type of employees will be needed in the future, it will be easier to define learning maps, hiring plans, and address specific problems. KM can bring their methodologies and tools to support the definition of personas, a work traditionally led by HR.

First, the knowledge inventory created in the Discovery phase contains a catalogue of skills currently existing within the company. These skills are tagged within the inventory for HR's usability, allowing them to search by standardized categories. Human resources can identify the skills that they wish to see developed in the workforce and project their evolution into the ideal worker personas. Knowledge management can then help differentiate the appropriate levels of knowledge and skill required in each phase of the transformation plan, which facilitates effective planning of upskilling and reskilling initiatives.

## Designing Product-Oriented Initiatives

There is a risk in developing initiatives within a transformation of creating work for its own sake. An initiative may appear to be in line with the transformation objective, but without an endpoint in mind, the work may simply waste time. For this reason, initiatives under the transformation must be product—not project—informed. The product mindset aims at defining a vision of deliverables that can be used to add value. Through this mindset the integrity of the company's reason for being is maintained—adding value for customers, employees, and shareholders.

As such, the executive and transformation teams determine the products that they wish to deliver, and from these the transformation CoP works backwards into initiative development. These initiatives are flexible but, in general, they break down the necessary steps between the goal product and the company's current operating capacity into workable tasks and behaviors. For very large product goals, many steps will be needed. For smaller or more supporting product goals, these could perhaps be simple.

Tracking the interplay between the capability building and initiative development aspects of the Scope phase can become difficult in its increasing complexity. KM's main task here will be to ensure that the transformation team and CoP do not get stuck in chicken-and-egg tangles, and can map the moving, evolving puzzle of the transformation with ease.

## Planning Resources, Roadmaps, and Defining Action Plans

At this point, the organization has completed its assessment of what it does and what it would like to do. It has determined what initiatives must occur to reach the transformation objective, how their workforce will be in its transformed state, and it is now time to plan the execution of initiatives. The roadmap is a top-down exercise wherein the transformation team decides how to allocate resources, and plans the execution of the transformation project. The Roadmap develops the dimensions of the Scope exercise as shown in Table 4.

Table 4. A summary of the roadmap’s main elements

<b>FTE (Full-Time Equivalent)</b>	Requires employees to complete the project, differentiating the skills required.
<b>Technology</b>	What platforms need to be in place?
<b>Data</b>	What data is required for the project?
<b>CAPEX (Capital Expenses)</b>	What is the required investment
<b>OPEX (Operating Expenses)</b>	What are the costs associated with the project?
<b>KPI (Key Performance Indicators)</b>	What KPIs will be measured to evaluate the success of each project?

The company now has a full set of ingredients to craft meaningful plans. It owns a robust inventory of its current capabilities, a wish list of potential ways to use these capabilities, and a circumscribing framework provided by top management. The transformation team has a potentially overwhelming amount of information. At this point, a hierarchy of initiatives must be developed.

This hierarchy is crafted by first plotting the potential changes outlined in the To Be exercise on a Cartesian plane with a y-axis of *feasibility* and an x-axis for *relevance* (see Figure 1). With this tool, the clutter of potentiality can be cleared, and a tiered priority system is created. Changes categorized in Quadrant 1 of the plane are determined to be *goals*—both highly relevant and highly feasible. Quadrant 2 contains *initiatives*—activities that may have a low level of relevance or impact, but a high level of feasibility. For their combination of low feasibility and low relevance, projects in Quadrant 3 are discarded. Those that are classified as Quadrant 4 are *bets*—things that, while not likely to succeed, would have a high impact if successful. Based on their risk profile and self-assessed capability, the initiative list is thus prioritized. It is important to note here that the prioritization is always contingent, flexible, and adaptive. As the transformation CoP works through each project, the firm must be prepared to onboard new information and knowledge. With the power of a strong KM program and meaningful effort put into prioritization, a firm can organize and reorganize its actions in a flexible manner.

### Step 3: Capability Building

The longest phase in the transformation journey will always be capability building. This includes upskilling the workforce, building a supportive IT environment, and embedding the transformation objective into standard business practices.

This can be a difficult phase of the transformation project, and there are important decisions to be made. Questions will arise regarding the development of human capital, especially revolving around the tension between developing the current workforce and seeking external assistance. There will also be a need to determine appropriate criteria for IT solutions and other potential offers from outside providers. Perhaps most challenging is the transformation of business practices, for they are the fundamental architecture for both workers’ output and the IT environment in which they work. The firm is further honing their transformation objective even in this stage, and through the slow work of capability building, they match reality to their desires.

Figure 1. A figurative representation to identify goals, bets, and initiatives



## Workforce Upskilling and Reskilling

Workers' capacity to perform and embody the transformation in their day-to-day labor is the very definition of its success. It is through the workers that the transformation objective is made manifest; the company's most pressing task is to upskill and reskill them.

The company must consider different ways to transform those working in relevant job roles into the personas built during the Scope phase, each with opportunities and drawbacks. Transformation practitioners must be mindful that competing firms are probably simultaneously transforming their companies in much the same way; such is the nature of *zeitgeist* in business, and therefore in the labor market. This fact is particularly important in considering the costs and benefits of different methods of upskilling. The following chart outlines the costs, benefits, and risks of externally hiring for capability and building the capability in-house through career development programs.

Judicious HR departments understand that both external hiring and career development strategies of upskilling should be used in creating the ideal workforce. Fortunately, a knowledge management mindset positively affects both options.

For one, the cost of onboarding external hires and incorporating them into the social fabric of the company can be reduced. An effective program of company culture and soft skills training can be built using the knowledge inventory's stock of lessons learned. New hires can be better matched to mentors using the people inventory, and they can use the inventory to find answers to their questions efficiently. These practices put new hires in touch with the company culture and history, and can decrease flight risk and increase company loyalty.

Career development programs benefit even more from a KM department. Where externally sourced training may be costly and not perfectly fit to the specific needs of the trainees; programs built in-house

*Table 5. Comparing approaches to capability building*

	<b>Benefits</b>	<b>Costs</b>	<b>Risks</b>
<b>Upskilling and Reskilling</b>	Preserves company culture. Opportunity to customize learning objectives to exactly match desired outcomes.	Hard skills frequently require expensive external training programs. Requires commitment from employees to their own growth.	Ineffective with ineffective programming. Lack of incentives to engage with learning materials may reduce effectiveness. Newly trained workers may leave for other firms.
<b>External Hiring</b>	Delivers needed capabilities on an urgent timeline. Can generate novelty vis-à-vis contact with existing workers.	Skill sets in high demand may be very costly. Onboarding costs are high. Company-specific knowledge and history is missing.	Likely to dilute company culture. Could increase turnover rates at the company overall. New hires may have low loyalty to the company.
<b>Career Development</b>	Preserves company culture. Increases length of employee tenure. Grows company by maturing current workers' status, responsibilities, and incentives.	Longer timeline. Higher effort. Requires advanced growth strategy.	Requires commitment from workers and from company. Turnover for in-demand skill sets often high. Adequate compensation is a must.

are both more affordable and bespoke. In-house learning modalities can also bleed into regular working practices and social experiences in ways that are not possible with turnkey upskilling solutions.

Most importantly, knowledge management-informed customized upskilling directs the company back towards itself. Workers' confidence in their upskilling and reskilling cannot be overvalued, and learning programs tailored specifically to workers' needs increases their confidence. A KM department can generate social, interactive means to engender learning in workers. Knowledge is best retained by those who feel attached to it, and in large part, attachment is a social function. Leveraging workers' natural inclination to work together and develop camaraderie can make upskilling both more effective and enjoyable for workers.

Table 6 shows complementary approaches for upskilling workers. Consider how they may lead to higher retention rates than typical trainings delivered via classroom-style presentations.

## Documented Infrastructure, Data, and Algorithms

Contrary to what enterprise software salespeople may say, there is no single solution to the challenge of defining and building a successful digital infrastructure. Workers typically visit five or six separate platforms daily, and in most cases each of these platforms are necessary components of their work processes. With so much disparate software, end-point users may become confused regarding the protocols, tricks, and languages of each. Without documentation of relevant aspects of the software, over the passage of time, knowledge of their operation may leave the firm. There must be internal processes to fight this entropy and retain optimal performance of the company's IT solutions.

The knowledge inventory is a fundamental tool to retain technical information. Centralizing and codifying tech knowledge supports the entire process of tech adoption, from discovering, reviewing, and evaluating tech processes, to creating and implementing IT products used in work processes. With it, the same iterative process of improvement that workers experience in upskilling can be enacted in the domain of infrastructure and software.



## Facilitating Organizational Change With Knowledge Management

Table 6. A summary of some open innovation methodologies

<b>Lunch Clubs, Speed Meetings, Open Mentoring, and Random Encounters</b>	These types of encounters are private encounters where workers meet to introduce themselves and get to know what they do at the organization. They are great for community building and networking, and can help employees clarify doubts about their work, become acquainted with what the organization does in other domains, and create opportunities for collaboration.
<b>Meetups</b>	Meetup sessions aim at sharing knowledge about specific issues. They are facilitated discussions that can serve to highlight the existing project portfolio, bring in subject matter experts, and help the community understand opportunities, challenges, and lessons learned from others. Meetups are a good initiative to generate a network of peers.
<b>Bootcamps</b>	Bootcamps are sessions specifically designed to help practitioners become acquainted with a particular process or tool. Users can get to know the technology better and resolve questions directly with the technology or data owner. These are hands-on learning sessions to deliver alternative methods for challenging work and validate methodologies used by different units.
<b>Hackathons</b>	Hackathons are unstructured work sessions where employees work intensively to resolve a specific challenge in a short time frame. These sessions are good triggers for innovation and the discovery of solutions.

The management of technical knowledge is often mishandled due to its tediousness and perceived uselessness. Knowledge management's influence over the culture that surrounds technology can be seen in the following practices.

In technology-oriented teams, documentation is a constant challenge. Many workers in these roles regard it as an unnecessary task that diminishes the team's productivity. This prioritization of speed to delivery ironically impedes progress in the long run, as old problems and their solutions fade from memory. As evangelists for documentation, sharing, and analysis, KM practitioners can play a role in correcting misapprehension towards showing one's work. By establishing CoPs that socially promote best practices, KM teams can achieve a fluid documentation system that is able to capture what is important in an efficient manner.

A knowledge management-informed transformation prioritizes the usability and accessibility of information, including a company's data. Datasets can become more broadly understood with the strategic application of metadata—tags, indexes, and data lineages all lower the barrier of entry to understanding what are often large, coded, and arcane documents. Of particular importance is documenting the lineages of composite data categories, which may contain the biases or old processes of their creator embedded within them. Increasing documentation also reduces redundancy and provides a window into the construction of meaning within the dataset, which, in turn, facilitates meaningful business decisions.

Most established companies are in the process of (or in need of) transformations focused on machine learning (ML) and artificial intelligence (AI) program implementation. In light of this global movement towards ML/AI, a company's algorithms are now key assets. Algorithms in ML/AI environments can transcend themselves and generate new data that can be made available for other purposes. While a generally open information environment within a company is the author's preferred model, these algorithms require higher levels of security for access. There are certainly business decisions that must be made with reference to algorithmic assets, and so KM professionals can provide useful interpretation between software teams and business units.

## Defining Roles, Organizational Structures, and Business Processes

Implementing a transformation roadmap will have an impact in the organization, but will it scale to the ambition imagined by the CEO? Will the transformation spirit remain alive once the initial hype has passed?

Knowledge management can ensure the priorities of transformation become regular practice by making sure that the roles and responsibilities created for the transformation become official and embedded within the company's culture. It is also important that KM practitioners produce documentation of business processes produced by the transformation and to ensure their implementation across departments. KM is, again, the discipline that can ensure a standardized procedure to document what is necessary, and to systematize the information to ensure transparency and good communication. KM concretizes changes in standard business practices in three ways.

The transformation plan will surely require employees to perform new tasks, thus roles must be defined. Tasks supporting the initiatives defined in Scope are collected into logical groupings. The tasks are then matched to worker personas, which will lead to the creation of new roles, i.e. Chief Data Officer, Data Scientist, Gender Expert, etc., which will become permanent in the organization. This exercise requires responsibilities to be described in such a way that anyone at the firm can understand them. The idea is not simply to create a job description to attract potential employees in the job market, but also to explain to other roles within the firm what they can expect from that specific role. A good role description contains their dos and don'ts to avoid misunderstandings. In large organizations, an excessive number of roles can lead to confusion, which creating clear outlines can help avoid. Roles should be included in the knowledge inventory and periodically re-evaluated for their fit to the current business landscape.

The second element in incorporating the transformation into business practices is to clearly define the organizational structures. Once the firm knows what the roles are supposed to do, relationship models are built that will define how these roles are grouped into teams, and how these teams will interact with the rest of the organization. The new teams will need a budget, a workspace, new tools, and new processes, which will affect the work of other teams. In thinking about these new organizational units, it will be necessary to measure and foresee how other units may be impacted.

Because of new roles, responsibilities, and organizational structures, the firm will need to map, document, and communicate the new processes to the organization, so that they are widely known by all the impacted parties. A good example of what KM can do for business process engineering is the process classification framework, created by APQC (APQC, 2018). This framework supports the classification and standardization of business processes; the definition of process KPIs that business process management teams can use to measure their progress.

### **Step 4: Pilot Execution with Agile and Experimentation**

Agile execution is a key ingredient to ensure a successful project deployment. Contrary to waterfall methodologies, agile projects take uncertainty and potential modifications of requirements and priorities as the main reference. To mitigate execution risks, agile teams tend to leverage different methodologies to ensure that the deliverables meet the customer's needs.

## Why Knowledge Management is Important in Agile

In agile, teams work in scrums—small multidisciplinary teams that contain all the necessary capabilities—to ensure the execution of the project. These teams share with one another on a day-to-day basis, grow together, and aim at becoming autonomous so that they can execute faster. Achieving autonomy implies having all necessary expertise to perform all required tasks.

In creating agile teams, staffing is critical. Ensuring teams have the right installed capabilities is something that can be done at scale only if the project requirements have clearly been identified and the required skills have been previously classified and matched to the existing workforce.

Agile teams also increase their execution capacity by constantly reflecting on the lessons learned in the execution. Agile teams hold ceremonies, such as *Sprint Planning*, where they design short-term execution plans; *Sprint Retrospectives*, where they reflect on what worked well, and what did not. These ceremonies are pure knowledge management exercises. Organizations that work with these methodologies ensure that at least a minimum knowledge is shared and distributed across teams. However, the real challenge is how to turn this knowledge into institutional knowledge that can be shared more widely with other teams in the company.

## Facilitating an Experimental Business Environment

Agile is a mindset that builds on two important elements: focus on value and experimentation. It is extremely unlikely that every new effort in a transformation project will work perfectly upon implementation. Companies must be prepared to fail and to document their failures. The root of the failure may then be interrogated, and thus form the germ of a new insight or solution. This can be challenging for workers, who have generally been acculturated to either hide or move forward quickly from their failures without stopping to evaluate them. Companies that wish to cultivate knowledge, and from it, wisdom, should find the means to change this disposition within their workforce and embrace failure as part of the ever-experimental process of innovation.

In an experimental business environment, every event is a learning opportunity. Every success and failure generates information, which can always be put towards some future challenge the business will face. By embracing the documentation of experiments and failures into the company's culture, they can become more self-aware and resilient. This is why the scientific method is such a durable framework for producing new insights. Its usefulness is in its inclusion of failure as a strongly possible outcome, which empowers its practitioners to find genuine success.

The scientific method can be a useful way to approach product development, both within and outside transformation events in companies. Through the process of isolating variables of interest, devising tests of their impact, iterating these tests, and discerning the results, daunting obstacles are suddenly simple tasks needing execution. The value proposition of the product can be refined, enhancing its utility. The scientific method also necessarily implies documentation, as its iterative aspects rely on information related to previous trials. Overall, re-orienting around the tried and true procedures of research brings structure and integrity to business experimentations and facilitates great product deliveries.

## **Step 5: Measuring Impact through Knowledge Analytics**

As emphasized throughout this chapter, reframing knowledge assets as intrinsically valuable and instrumentalizing them effectively is key to the success of transformation projects. This reframing is inclusive of traditional sources of information and data, but may lead to a reevaluation of the data generated by day-to-day operations, such as calendar invites, emails sent, or documents shared. While such an expanded scope runs the risk of being too thorough, meaning and utility can be found in these unlikely sources.

It is here where the subfield of knowledge analytics can be useful. Housed within knowledge management departments, knowledge analysts can connect various data types using novel analytical approaches and reveal heretofore-unseen connections within. Complex questions, particularly those relating to the interactions and behaviors of workers and customers, can now be parsed, generating more concrete insights into the effectiveness of the transformation than the hunches and anecdotal feedback that once drove these conversations.

Knowledge analytics professionals are bringing to businesses methodologies from computational social sciences such as network and cohort analysis. These tools can track interactive behavior between members of the transformation community of purpose, for example, informing a picture of its evolution over the course of the transformation project. Network analysis also makes it possible to understand how CoP members collaborate in the process of projects, generating insights about the company culture generally that could only otherwise be guessed. Aspects of group dynamics such as cohesion, centrality, clustering, and exploration, can be revealed and therefore tweaked. In this way, the firm has much better oversight of workers without direct surveillance, enabling smoother changes in work processes and a seamless experience of work for workers.

Cohort analysis can also be useful to track the evolution of groups' behaviors over time. This set of tools is generally used to track the behavior of customers over the lifecycle of their interaction with the company, and the same tools can be turned inwards towards a company's workforce. In light of the importance of workers' participation and buy-in in a transformation project, how workers are changing their behaviors and responding to their upskilling and new technology solutions over time is a key metric of success.

The inclusion of such advanced modeling techniques can also improve more standard business analytics. Of course, knowledge analytics can be used to measure the effectiveness of a KM program to reinforce its utility and to find areas of improvement. When coupled with financial data, cohort and network analyses can accurately measure the cost-effectiveness of training programs, new technologies, and even the transformation project overall. Analyzing word use in corporate communications or customer satisfaction surveys produces measurements of the impact of culture change in engagement, productivity, brand perception, etc.

Overall, knowledge analytics help to create a picture of the company that is more integrated and nuanced than reliance on more simplistic methods of analysis. Companies that anticipate the complexification of analytics beyond financial and sales data will be better equipped to forge ahead in a world where successful business strategies rapidly change, as they are better able to draw upon their own strengths. As the knowledge inventory is constantly referenced and refreshed, it becomes more central to business planning and product development, reinforcing its own usefulness repeatedly.

## **Disseminating and Communicating Results**

A knowledge-oriented business mindset should be couched in the principles of open information. The old maxim that “knowledge is power” retains its potency for a reason—it is simply true that the more information flows, the better informed and, therefore prepared, are those who possess it. Open information environments empower employees to gain access to such power for themselves and engender a sense of trust between the firm and the employees. Secrecy and privileged access should be selectively applied in circumstances where openness may compromise the company’s security, but this is the exception, not the rule.

In fact, an internal communication strategy that prioritizes disseminating information can have great benefits. Knowledge must be dispersed judiciously throughout a transformation project to facilitate the work. Context and guidance are crucial for the transformation team and transformation CoP, and beyond this, KM professionals should be made central to the modern company’s internal and external communications. Their role naturally implies input into the creation of newsletters, presentations, dashboards etc., and they can enrich each medium with related extra-departmental context.

News of the transformation project must be tailored for specific stakeholder groups. Steering committees and executives will need long-term, strategic evolutions mapped, and visualized, viewing the transformation as a whole using benchmarks and metrics informed by the Discovery phase. Employees involved in the transformation will require the same information presented in walk-throughs and specific examples of a transformed process, along with a narrativization of the project. Audiences not involved will need specific outcomes explained so they can make use of the improvements and quickly adapt their conversations with clients to leverage new opportunities.

Systems built in previous phases are satisfyingly re-deployed to facilitate the communication of the end-result and maintain a flow of information. The knowledge inventory’s tagging and sorting functions will be useful in providing communications developers with evidence and information easily, objectively, and independently. The CoP members will deliver news to their respective departments organically, and the lunch clubs and meetups created for upskilling may remain active to keep employees engaged and socializing.

In a sense, KM’s role in a transformation can be metaphorized as developing an internal vascular system for information. They reify, then centralize information, and ensure its dispersal and continued circulation. The process of transforming towards an objective has the knock-on effect of transforming towards information sharing and pro-social openness, a virtuous cycle with long-ranging effects. Increased openness leads to better product development, better resilience, and internal trust. Whatever the transformation objective, KM practices and ideologies become intertwined with its operation, and seep into the company’s culture.

## **FUTURE RESEARCH DIRECTIONS**

Three areas of research will see significant developments in the upcoming years: how to create organizations that place the user at the center of the strategy; how to plan for exponential growth; and how to truly leverage the power of analytics.

User centric organizations (User Experience/User Interface [UX/UI]) or human centric design is a well-known discipline, and some organizations have aimed to put the user—and more commonly the

customer—at the center of the company’s strategy. Sometimes, however, customers and employers are treated differently. KM theory must continue to investigate how to place humans at the center of its value proposition.

Exponential growth will be a leading issue in the upcoming years. How companies can grow fast without losing internal consistency will become a key for success, even more in a context of remote working where physical interactions will severely be diminished. With companies loosening in-person policies, employees will have less chances to share what they do and understand their mission in the company. New organizational designs, such as edge organizations, or product driven organizations are two promising areas of research.

The literature about knowledge analytics will also be a relevant area of research. KM professionals and departments will need to increase their capacity to work with programming languages, such as Python, and big data infrastructures, as they will become more important to develop new applications for Natural Language Processing and Knowledge Graphs. This will allow them to gain a capacity to leverage the potential of Artificial Intelligence to classify, compare, detect, optimize, forecast, and recommend.

## **CONCLUSION**

The utility of knowledge management functions in corporate strategy change is, in large part, due to its very presence. Allocating resources and labor power to the activity of gathering and disseminating knowledge is a statement of commitment to knowledge and wisdom as guiding forces in business. The values and ideologies that are manifest in KM—knowledge capture and organization, intradepartmental communication, prioritizing skills development, and learning—will only result in stronger, more robust transformations, and a stronger, more robust workforce.

KM professionals are by nature firm believers in transformation and continuous improvement. They are natural facilitators, curious learners, competent technical practitioners, and translators. Their role in breaking silos and ensuring the flow of information can be transformative in itself, and their embrace of heterogeneous methodologies signals an openness to different perspectives that implies trustworthiness. For these reasons, KM workers and departments are well positioned to not just participate in, but lead corporate transformation projects. They can be the transformation evangelists that every company needs to facilitate the adoption of a new corporate strategy and engage all parties in alignment towards a shared vision.

Ultimately, in deciding whether to include knowledge management practices and professionals in a transformation, a company is deciding whether to take full advantage of the data revolution sweeping the globe. The ability to adapt quickly and effectively to the market rests in competency, which generates knowledge, which generates competency. Change makers at all levels of an organization, and organizations of all sizes, ought to harness the potent transformation catalyst that is knowledge management, and enjoy the success of an adaptive, resilient, and wise company.

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## KEY TERMS AND DEFINITIONS

**Agile:** A mindset that seeks efficiency in the development of products by placing the customer needs at the center of a team's focus.

**Ceremony:** In Agile vocabulary, rituals where teams convene to agree on the execution priorities and review the team's performance.

**Community of Purpose:** A community of people driven by a common interest to achieve something greater.

**Human-Centered Design:** An approach to problem solving that brings the human perspective to the problem, evaluating solutions from the point of view of their desirability, viability, and feasibility.

**Knowledge Analytics:** A discipline that leverages Artificial Intelligence to extract metrics about the existing or missing knowledge in an organization.

**Open Innovation:** An approach to innovation that enables collaboration between competitors.

**Open Knowledge:** Knowledge that is reusable by anyone without cost.

**Product:** A deliverable that can be put into the hands of the customer that drives value and can be repeated and improved.

**Scrum:** In Agile, Scrum is a lightweight framework that helps people, teams, and organizations to generate value through adaptive solutions for complex problems.

**Waterfall Methodology:** A project management approach that consists of thorough initial planning and sequential execution; it relies on the assumption that initial requirements will not change during the execution of the project.

# Chapter 12

## Towards a Learning Organization: Navigating Barriers, Levers, and Employees' Capacity for Change

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### **ABSTRACT**

*A learning organization is one that is consistently capable of adaptive change in response to signals from its environment. However, knowledge management initiatives to enact learning organizations have not been uniformly successful. This chapter focuses on the role of the psychological environment of the individual in enabling or hampering organizational learning. Six theories drawn from multiple fields are reviewed to identify both opportunities and barriers to fostering change at the level of the individual. These include orientation to learning, motivation to act, and capacity for change. However, the authors argue that organizations ought to be regarded as complex social systems. Change strategies intended to foster a learning organization are more likely to succeed if they embrace the idea that designing change for complex social systems requires a special approach: design thinking. This is characterized by iterative prototyping, experimenting, trialing, and piloting changes to work processes, structures, and tasks.*

### **INTRODUCTION**

More than two decades ago, a global wave of digital infrastructure investment began, primarily to avoid Y2K calamity. This same wave also ushered in new capabilities for information use that are now taken for granted, such as being able to search for information across an entire enterprise. With these new capabilities came a general expectation that organizations would inevitably become “smarter,” simply as a consequence of this investment. There are many stories in the literature of knowledge management

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triumphs: specific initiatives, projects, and technologies successfully used to promote knowledge creation, knowledge sharing, expertise location, knowledge mobilization, knowledge translation, improved decision-making, and the list goes on. However, successful examples of such change seem to be a hit-and-miss affair: the burgeoning field of knowledge management has not established consistent success. This is not for a lack of effort by both theorists and practitioners in search of a reliable path to better outcomes. Terms such as “change management,” “knowledge assets,” and “employee empowerment” have entered the 21<sup>st</sup> century knowledge-economy lexicon. What appears to be largely absent from this discourse, however, is a consideration of whether there are foundational, systematic barriers to effective knowledge use, such as a failure to recognize the needs of individual employees, for effective organizational learning to occur.

This chapter uses the lens of *organizational learning* as a holistic construct to describe the potential of an organization to make maximum effective use of its information and knowledge assets. The focus of this chapter is the corollary to that statement: barriers to organizational learning may help explain instances when knowledge management initiatives have not succeeded. The target of analysis here is not the organization, but the *individual*, operating within the socially constructed environment provided by an organization. It is argued here that more attention to the psychological environment of individuals may help knowledge management projects to succeed. However, a focus on the individual is complicated terrain: broad paradigms such as “employee empowerment” may be naïve if they fail to anticipate, much less mitigate, significant obstacles to the cognitive and behavioural capacities and limits of individuals to engage in work changes driven by organizational learning.

## **Organizational Learning**

Organizational learning can be broadly defined as the ability of an organization to respond effectively to changes in its internal and external environments. This includes making sense of new information, deriving useful insights, making decisions, and changing behaviour accordingly. By analogy, *individuals* learn by making sense of experiences they have and information they encounter, using these to grow knowledge and inform action to enact change; organizations adept at learning do the same.

However, as organizations are collectivities of individuals, the learning process is necessarily more complex than that of an individual. Most organizations are capable of some adaptation to change, but not necessarily to the extent of smoothly managing several kinds of ongoing change derived from organizational learning. The scope of change can include the content of work itself, organizational structures, work practices, policies, and resource allocation. An organization that is consistently adept at responding to change can be called a *Learning Organization*.

Many scholars and authors have grappled with the challenges associated with establishing and sustaining a culture of creating, retaining, transferring and utilizing knowledge effectively within an organization. While organizational learning has been explored a great deal at the level of organizational culture and group behaviour, less attention has been devoted to the psychological level of the individual. This chapter addresses this oversight.

## **Structure of this Chapter**

This chapter is organized into two parts. Part 1 introduces six theories from five different fields to explore why an organization’s ability to use information and knowledge effectively to learn and adapt often seems

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elusive. The fields are psychology, sociology, organizational behaviour, knowledge management, and social work. As shown in Table 1, these theories are divided into three key dimensions of organizational learning: orientation to learning, motivation to act, and capacity for change. Each theory contributes a valuable perspective on the intricacies associated with cognition and behaviour by individuals in an organizational setting. Collectively, these form a useful foundation for understanding the complex set of individual and group behaviours as a force for inertia as well as change.

Table 1. Six theories connecting the individual to the learning organization

Dimension	Theory	Authors	Core Concepts
Orientation to learning	Communities of Practice	Lave and Wenger (1991)	Workplace learning as dynamic participation within a trusted community of individuals with a common body of knowledge.
	Single-loop vs. Double-loop Learning	Argyris & Schön (1978)	Organizational learning as dependent on the ability of individuals to question assumptions, beliefs and current practices.
Motivation to act	Principle of Least Effort	Zipf (1949)	Commitment to change as dependent on an individual's appraisal of the ratio of perceived benefit to effort.
	Transtheoretical Model	Prochaska and DiClemente (2005)	Change as a necessary series of stages experienced by individuals, from contemplation to readiness.
Capacity for change	Cognitive Dissonance Theory	Festinger (1957)	The tight coupling between individuals' attitudes and behaviours can either act as a barrier or a lever for change.
	System Justification Theory	Jost, Banaji & Nosek (2004)	How an organizational <i>status quo</i> can be actively defended by those who are nevertheless fully aware of its flaws.

Some of these theories are many decades old: scholarly inquiry into learning as a social behaviour has a long, venerable history. However, these older theories are mostly *new to knowledge management*, as evidenced by their conspicuous absence from the contemporary knowledge management literature. This chapter seeks to change that state of affairs, contending that understanding and applying these classic theories to knowledge management research and practice are crucial to navigating organizational learning barriers, levers, and employees' capacity for change. It may seem daunting, or even impossible, to navigate this complex set of theories in the quest to identify barriers and opportunities to enact a learning organization. This complexity helps explain why effective learning organizations are so hard to achieve.

Part 2 of this chapter introduces design thinking as an effective approach in the face of this complexity. It proposes that organizational change derived from organizational learning can be repeatedly prototyped to cope with barriers, levers, and capacity for organizational learning in an organization. Prototyping can enable organizations to iteratively experiment with structures and processes, activate change levers, and mitigate obstacles among employees. Prototyping in business is founded on the belief that organizations rarely get it right the first time, and therefore they should not be *expected* to do so. Rather, small-scale initiatives can be trialed and analyzed for feasibility and barriers on many levels, including employees' capacity for change. Not coincidentally, the act of prototyping change in an organization embodies ex-

actly what learning organizations are supposed to be able to do: make effective use of new information to learn from experience and change accordingly.

## **PART 1 – THEORIES AND MODELS**

### **Overview**

The six theories summarized in Table 1 are each explored below. At first glance, they may seem quite disparate. However, they do have a key commonality: identification of barriers, levers, and capacity of individuals to propel organizational learning. The categorization of these theories as orientation to learning, motivation to act, or capacity for change, is not intended as a sharp division. They are complementary and they overlap. Communities of Practice focus on trust and sharing as key components of mutual learning. Single/double-loop learning identifies common deficits in the amount of time and effort allocated to problem-solving. The Principle of Least Effort provides two dimensions – effort and perceived benefit – where changes to practices, policies, and rewards can be targeted. The Transtheoretical Model provides an affective perspective on the plight of the individual facing change without being ready to do so. Cognitive Dissonance theory explains how attitudes shape and limit actions, and conversely how behaviours can shape attitudes. System Justification Theory explains how unfair workplace practices can be defended even by those who are disadvantaged, constraining the ability to enact positive change. Collectively, these theories help explain why change initiatives intended to foster a learning organization can often fail: there are so many ways that excellent intentions for the organization can run into conflict with the psychology of the individual.

### **Communities of Practice**

A vital concept in organizational learning is that of a *learning community*: a group of connected individuals who mutually reinforce each other’s professional learning. Lave and Wenger (1991) popularized this notion when they introduced the term “Community of Practice” (CoP) as “a system of relationships between people, activities, and the world; developing with time, and in relation to other tangential and overlapping communities of practice” (p. 98). Not all forms of collaborative work or problem-solving are considered a CoP, however. In fact, most are not. Key characteristics of a CoP include a common profession or specialty within a profession, and a common body of knowledge. Moreover, CoPs are self-organizing: they form because of the natural inclinations of members to exchange knowledge toward a common passion for knowledge and learning. Another important CoP feature is that there is a range of expertise and experience within the community: junior members learn from more senior ones. Thus, the learning that takes place within a given CoP is dependent on the competence and experience of its individual members, *as well as* their openness to sharing their expertise. The ability to learn from others is also predicated on a feeling of safety and trust: it can be a profoundly vulnerable act to admit ignorance in a professional context.

Wenger (2000) lists many factors that foster CoPs, including: 1) open communication among members, unconstrained by politics or reporting relationships; 2) a shared vocabulary that reflects a shared set of knowledge; 3) formal and informal interactions among members, which may range from regular, scheduled meetings at work, to casual polling by email, and activities outside of the workplace; 4) a

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focus on learning by doing, which means that knowledge exchange is directly related to work activities; 5) having a clear, shared vision for the purpose, role, activities, membership and norms within the group; 6) the explicit identification of individual members' skills.

While CoPs do tend to be self-organizing, they can be encouraged (or impaired) by policies and practices in an organization. Wenger (2000) provides some suggestions for managing aspects of each dimension, such as having managers actively encourage select employees to assume a knowledge-brokering, or "go-to person" role. Formally allocating time for knowledge sharing activities by the group, and reflecting these activities in performance reviews are also important ways to promote healthy CoPs. Finding ways to connect multiple CoPs together, through some shared or overlapping membership, has also been suggested as a means to increase the likelihood of innovation and new ideas, due to an increase in diversity (Amin & Roberts, 2008). Providing tools for effective online communication within and outside of the organization is particularly important. However, Pyrko, Dörfler, and Eden (2017) caution that the CoP should be defined by its membership, *not* its electronic infrastructure: it is vital to "draw a sharp line between the CoP and the tools it uses" (p. 399).

One caution on the use of the term "community of practice" is in order. The term is often conflated with other kinds of social structures or informal groups in organizations. Both Wenger (2000) and others have warned that if learning and knowledge are not produced in a CoP to benefit the organization, then the entity may devolve into a social club of limited value to achieve a learning organization. Moreover, even with the best of intentions, a CoP can also become bogged down or stagnated by feudal organizational politics which may conflict with open sharing of information and knowledge (Nithithanatchinnapat et al., 2016).

A CoP in an organization can act as a powerful engine of organizational learning by providing structure and process for knowledge creation within a group. In fact, a CoP might be best understood as a microcosm of a learning organization: its members are oriented to making sense of new information, deriving insights, exploring new ideas, and collaborative problem solving.

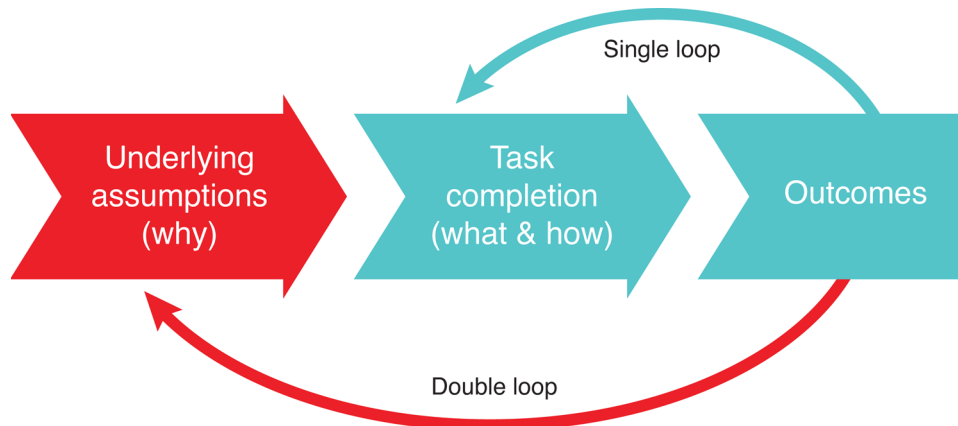
## **Single-Loop vs. Double-Loop Learning**

Argyris and Schön (1978) describe two types of learning that can take place in an organization as individuals go about their work: single-loop and double-loop learning.

Single-loop learning attempts to rectify an issue or a problem within the confines of its environment without questioning existing policies, structures, assumptions, or processes. Problems are addressed expediently without necessarily preventing the problem from recurring. Tucker and Edmonson (2003) conducted a longitudinal, qualitative study of problem solving in hospitals, finding over 90% could be characterized as single-loop learning. Examples included hoarding scarce equipment to ensure it was available when needed, and using expensive taxi-cabs to courier essential supplies when they unexpectedly ran low. Such problems are effectively dealt with in the moment, but nothing is done to prevent recurrence because the underlying problems are not even identified, much less addressed.

By contrast, double-loop learning seeks the root of a problem by focusing on why a problem is happening. In taking this approach, values and assumptions embedded in current practices may be questioned. Consequently, changes to policies and practices might be indicated that may not, at first blush, seem directly related to the problem at hand. Why a particular piece of hospital equipment is in short supply may suggest changes to procurement practices and budgets; chronic shortages of supplies may indicate

Figure 1. Single-loop vs. double-loop learning



inadequate planning or misunderstanding elsewhere in the organization. An illustration of single-loop versus double-loop learning appears in Figure 1.

What predicts whether employees will engage in single-loop or double-loop learning when solving problems at work? Tucker and Edmonson (2003) suggested that the work culture at the hospital did not encourage deeper problem-solving, nor was time typically available to do more than the minimum patch when such problems arose. However, underneath these organizational constraints lies a very important qualitative difference in how individuals are actually thinking. Argyris (2004) describes “Model 1” versus “Model 2” thinking, which closely parallels the “System 1” and “System 2” thinking described by Nobel Laureate Daniel Kahneman (2011).

Model 1 thinking is characterized by rapid, defensive reasoning. When a problem arises, individuals focus on *what* and *how*: *what* is the visible problem, and *how* can a strategy be immediately workable given available resources, space, and time. Argyris argues that Model 1 thinking is inherently self-preserving; it aims to leverage data that support the personal objectives and/or goals to gain control over other individuals or factors within an environment. As a result, consequences are self-sealing and closed to honest feedback from others (Argyris, 2004).

By contrast, Model 2 thinking involves ruminating on a problem beyond the immediate. It requires a certain amount of reflective time to explore what underlying or related issues may be driving the problem. Argyris suggests that Model 2 thinking orients to valid information that leads to free and informed choices from others, thereby sharing control as well as encouraging full participation within the design and implementation process. Thus, Model 2 thinking can reduce defensiveness while also promoting double-loop learning.

However, double-loop learning can be difficult to instill among employees. Argyris (2004) discusses four different managerial interventions that can be undertaken to facilitate double-loop learning. The first is to address what he calls the “responsibility virus,” which can manifest among employees as refusing to take responsibility for a problem, or individuals exerting total control by taking full and sole responsibility. Either extreme can impair double-loop learning. His second suggestion is to explicitly identify defensive thinking where it occurs in organizations so that responsibility, outcomes, and rewards can be aligned. His third suggestion is to implement a “democratic hierarchy” that aligns decision-making authority with the impact of decisions, and reduces siloed decision-making.



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There is a limitation to Argyris' suggestions for intervention, however: he assumes that a top-down approach to change can succeed without concomitant education of individuals about modes of thinking and acting. In other words, Argyris does not include the need for employees to learn about learning as a vital step in changing how problem-solving and learning are to unfold. This may create an unfortunate irony in embracing a top-down approach: achieving change in how problem-solving and decision-making happen in an organization requires a double-loop learning process itself. If employees are not complicit in the "why" – the challenging of values and assumptions that enact Model 1 thinking – then they may not be able to engage in the double-loop learning needed to shift from Model 1 to Model 2 thinking.

To achieve Argyris' democratic hierarchy, employees need to have a clear understanding of Model 2 productive reasoning so that they can avoid Model 1 defensive reasoning while engaging with the necessary skills, incentives, and vigilance in personal responsibility and monitoring of choices in the workplace. It is not reasonable to assume that most employees are familiar with organizational learning theory. This may represent a significant barrier to becoming an effective learning organization. Achieving change in the way that problem-solving and decision-making are done requires creating a curriculum for employees to understand cognitive styles and decision-making structures. Equipped with such an understanding, employees might begin to recognize these issues themselves, enabled to engage in reflexive, double-loop learning.

Although it may not be common, evidence of double-loop learning can be found in organizations. For example, Metallinou (2017) studied a review of emergency management practices at a Norwegian pipeline, discovering that while recommendations for improvement were mostly single-loop, there was also some evidence of double-loop learning in the identification of common, underlying issues, such as communication effectiveness between departments. This raises the question: what caused double-loop learning to occur in this instance? There is an implication for managers that double-loop learning can be used as a lens to identify where high-quality learning and decision-making are taking place (or not) in their organization, as a first step to rewarding and fostering Model 2 thinking.

## **Principle of Least Effort**

The principle of least effort (PLE) was developed by Harvard linguist George Kingsley Zipf initially to explain why most people use only a very small portion of their vocabulary most of the time. However, it has been applied in diverse fields from evolutionary biology to library science. Simply put, the PLE holds that people will tend to maximize benefit while minimizing effort; every action is appraised as a ratio of benefit to effort, where an individual will likely select a course of action with maximum benefit for the least amount of effort (Zipf, 1949).

In the case of library science, many studies have found PLE to be at play where the information seeking behaviour of individuals ceases as soon as the individual finds an acceptable result, rather than an optimal one (Yu-Wei, 2015; Zao & Zheng, 2004). "Least effort" should not be confused with laziness: individuals will exert considerable effort *if* a proportional benefit is expected. However, an individual's appraisal of effort and benefit are not objective: effort is nearly always tangible and immediate, while benefits can be intangible and remote in time. Thus, the perceived benefit may tend to seem less than it is. The PLE can be used to explain why healthy eating and saving for retirement are difficult behaviours for many to sustain: in such cases, the up-front effort is painfully obvious, but the benefit is very abstract, and it accrues in the distant future.

The relationship between the PLE and organizational learning is significant. Consider the prospect of contributing a new idea at work. The prospective benefit of the new idea may be unclear. On the other hand, the effort of putting the suggestion forward may range from very low to very high. An online “suggestion box” form or a happenstance “water cooler” conversation may represent very little effort; composing a persuasive email to multiple recipients may require moderate effort; planning a presentation for a formal meeting of senior managers may represent overwhelming effort.

It may be possible to increase employees’ perception of benefit by fostering a culture where new ideas and initiatives are explicitly welcomed and publicly acknowledged. However, in many contexts, the PLE is most usefully applied in considering how to reduce the perceived effort in proposing something new, along with the perceived effort in gathering whatever information from inside or outside the organization might be required. Employers who are able to offer information and knowledge support to employees – along the lines of a reference library service – may succeed in lowering the perceived effort of proposing innovation. That might be expected to increase activities that support organizational learning, even without any concomitant effort to increase the perceived benefit of engaging in such activities.

Zipf’s 70-year-old linguistics theory offers two very practical levers for organizational learning and knowledge management transformation work. First, managers would be well advised to cultivate a perception of benefit that is tangible and immediate, not a general ideal. Second, equal attention should be paid to perceived effort required, such as streamlining processes, automating nuisance tasks, and selecting or designing digital tools that closely fit what they are meant to do.

## **Transtheoretical Model of Change**

Prochaska and DiClemente (2005) developed the Transtheoretical model (TTM) based on a public health study that examined smoking cessation among individuals. The TTM is unique for conceptualizing change as an iterative, non-linear approach. According to Prochaska and DiClemente (2005), when individuals attempt to alter their behaviour, they experience a series of changes through five phases. These five phases are: 1) pre-contemplation, 2) contemplation, 3) preparation, 4) action, and 5) maintenance. The researchers also include the aspect of relapse, which is not viewed as a phase but a fork in the road from either phase four (action) or phase five (maintenance) (Prochaska & DiClemente, 2005). While there is no set duration on how long an individual may reside in a phase, there are specific tasks that an individual carries out that demarcates one phase from the next. Additionally, individuals may recycle through each phase or relapse to a prior phase.

While TTM has been applied widely within the fields of public health and social work, it is also a useful theory for organizational learning, as it may help to explain the resistance to change that leaders face when implementing a change initiative. For example, if an organization were to implement new, electronic collaboration tools, then it may be helpful to structure the communication, roll-out, and timing of the new initiative in a manner and time frame that is digestible to employees. There may be times when leaders only begin to discuss changes after they themselves have gone through their own process of pre-contemplation, contemplation, and preparation. As a result, the change process may become frustrating or even threatening to employees who were not included in the contemplation and preparation phases. Consequently, they may feel excluded or be effectively un-empowered to truly make sense the rationale for change.

There are some limitations to applying the TTM for organizational learning. First, the stages do not necessarily follow a linear progression or a predictable timeline, so the TTM cannot be used to fore-

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cast change. Nor are relapses necessarily predictable. Rather, TTM is better used as a framework for planning a change process in a way that allows for employees to locate themselves in a phase, and that allocates time and resources to facilitate discussion and reflection about readiness. The TTM can also be a useful forensic lens to try to make sense of resistance to change expressed by employees during a process of change.

The implications for practice pertain to communication and thinking about change. According to the TTM, people cannot be *readied* for change by managers; they need to achieve readiness on their own, through a mindful process. Moreover, the path to readiness may vary greatly between individuals, so a uniform approach to galvanizing a workplace is less likely to succeed than one oriented to engaging the individual. A series of one-on-one or small-group conversations between employees and a neutral outsider trained in motivational interviewing can help uncover beliefs, attitudes, and feelings that will interfere with implementing a learned need to change. Motivational interviewing involves co-exploring pros and cons of the status quo, alongside pros and cons of the intended change. This process can take time and effort, but it is widely recognized as an effective approach to build readiness for change, as well as the motivation to do so.

## **Cognitive Dissonance**

Cognitive dissonance (CD) theory describes mental discomfort that is produced when an individual is faced with misalignment, inconsistency, or contradiction between attitudes and behaviour (Festinger, 1957). Given a particular attitude, individuals are far more likely to engage in behaviours consistent with that attitude, and to resist behaviours that are in conflict. Conversely, if a particular behaviour has been expressed, attitudes will tend to coalesce in a way that is congruent with that behaviour.

A classic demonstration of CD and behaviour change was given by Freedman and Fraser's (1966) psychology experiment. Researchers went door to door, asking residents to consent to hosting a large ugly lawn sign opposing drinking and driving. Not many wanted the sign on aesthetic grounds. However, when researchers first asked residents simply to sign a petition opposing drinking and driving, and then later re-visited the same households to propose the sign, uptake was much higher. Having committed to one behaviour – petition signing – caused attitudes to coalesce, making the second, larger request more appealing. Festinger (1964) extended the concept of CD, with what he termed “justification of effort”: this describes a pre-existing attitude being used to defend an action or series of actions that would not seem logical or reasonable on their own.

Over six decades, CD has played a pivotal role in management studies as well as psychology, for its wide applicability to (mis)alignment of attitudes, beliefs, values, and decision-making play out amongst individuals (Harmon-Jones & Mills, 2019). For example, Dechawatanapaisal and Siengthai (2006) measured CD and impact on organizational learning during a period of organizational change, and found CD played a significant hindering role. However, as Freedman and Fraser's (1966) research demonstrates, CD can also be used strategically to *elicit* behaviours or to modify attitudes.

Cognitive dissonance carries some powerful implications for practice, namely the ability to elicit desired behaviours and attitudes. For example, imposing sweeping change in work practices, such as with a new software system, can certainly be disorienting and frustrating: negative experiences will foster negative attitudes. A CD-inspired approach might involve introducing only one feature at first, and doing it well, to achieve the opposite effect. For example, switching to a new reimbursement system represents

a disruption, but making the submission easier and reimbursement faster will engender positive attitudes and likely more receptivity to additional use of the system.

## **System Justification Theory**

System justification theory, advanced by social psychologists Jost, Banaji, and Nosek (2004), describes the mechanism by which individuals in a social system may defend a status quo, even when they recognize its faults, and even when those faults may limit their own well-being. The authors propose that justification can happen at the level of the group or the organization. Group justification is associated with a desire to sustain a positive image of a social group or work team, as well as to defend and justify the actions of fellow members. System justification is associated with a tendency for individuals to see the dynamics of an existing organization as legitimate because they rely on it, therefore defending it even when it is clearly not fair. To defend an existing system, defects and all, is to not rock the proverbial boat. This imperative for inertia can prevent members from challenging what is stable, which in turn leads to the perception that the status quo is inevitable as well as necessary.

Disadvantaged group members may only participate in change when ego justification and/or group justification is sufficient to overpower the strength of system justification, and that may rarely happen. Consider gender inequality that women face in workplaces. This can be manifested in expectations around dress, in lower pay for equal work, and in systematic under-representation in senior roles. Similar inequities can be identified for racialized employees in many organizations. Such clear and explicit inequity may be tolerated by all parties, because the justified system that perpetuates it is stronger than that of constituent groups or individuals. Organizations can certainly be conceptualized as a *system*, with established norms, values, and hierarchies. As stated by Proudfoot and Kay (2014),

*Much like the government imposes laws and policies on its citizens that constrain and guide individuals' behavior and access to resources on a daily basis, organizations impose rules and guidelines on its employees that similarly structure individual action and outcomes. Thus, psychologically, both types of systems supply people with an assigned set of roles (e.g., citizen, employee), interrelationships with other people and structures (e.g., membership in a local municipality, position within the organizational hierarchy), and norms that make daily life orderly and predictable. (p. 175)*

Proudfoot and Kay (2014) found that when employees face restrictions or constraints in their workplace, they are less likely to discuss the inefficiencies or negative dynamics that result. Employees disadvantaged by an inequitable system may not feel comfortable contributing effectively in meetings, or sharing their ideas. Justified inequity may significantly limit or even prevent organizational learning altogether.

The implications for practice of System Justification Theory are complex, because issues of inequity are complex. However, this theory can be readily applied to improving organizational learning, by recognizing the opportunity for organizational leadership to challenge perceptions of inevitability of the status quo, particularly around power relations. System justification and double-loop learning have an important relationship, because the second loop – using “why” questions to challenge underlying, tacit assumptions – may be badly constrained if participants believe that the status quo is inevitable. The late U.S. President John F. Kennedy once opined that whereas some view the world as it is and ask “why,” he viewed the world as it has never been, and asks “why not.” This sentiment precisely frames how countering system justification can enable envisioning change.

## Summary

The six theories described here all contribute to describing the complex mosaic of employee engagement in organizational learning. **Communities of Practice** (CoPs) describe how expertise can be shared and mutual learning supported. By contrast, a failure to nurture CoPs can result in limited sharing, knowledge exchange, and innovation. Engendering **double-loop learning** is vital for employees to rise above routine and habit, to question prior assumptions and values that circumscribe work tasks and prevent underlying problems from being identified, much less addressed. The **Principle of Least Effort** frames motivation as a ratio of benefit to effort; opportunities may exist to modify either effort or benefit with a positive effect. The **Transtheoretical Model** provides a qualitative, affective perspective on the psychological readiness of individuals in an organization to abide programs of change. **Cognitive Dissonance** theory explains how the drive to align attitudes and behaviours may cause individuals to be resistant to change. It also suggests there may be opportunities to propagate changes in attitude or behaviour by strategically introducing misalignment for individuals to resolve. **System Justification Theory** explains how unfairness in an organization can be perpetuated and even defended by stakeholders, limiting capacity for change. Key implications of these theories for each organizational learning dimension are summarized in Table 2.

*Table 2. Implications of each theory for organizational learning success*

Dimension	Theory	Implications for Organizational Learning
Orientation to learning	Communities of Practice	Are CoPs active? They indicate a positive orientation to organizational learning. If CoPs are not active, what policies, resourcing, and active encouragement could be mustered to encourage them?
	Single-loop vs. Double-loop Learning	Can patterns of recurring problems (single-loop learning) be identified? Can adequate, focused time and human resources be allocated to enable thoughtful, double-loop problem-solving?
Motivation to act	Principle of Least Effort	Does organizational learning seem to require too much effort? Can it be reduced? Is the benefit of organizational learning explicit and clear? Can that be improved?
	Transtheoretical Model	Are employees psychologically prepared for change? What are the obstacles they perceive? Have they internalized the need, imagined the outcomes, and processed anxiety?
Capacity for change	Cognitive Dissonance Theory	Can resistance to change be attributed to a mismatch of attitudes, expectations, and desired behaviours? Is there an opportunity to engender change by achieving alignment, or by strategically applying <i>misalignment</i> ?
	System Justification Theory	Can resistance to change be explained in part by a default defense of the status quo to preserve stability? Is there structural inequity that can impair cooperation needed for organizational learning?

There are four important cautions from this review of theory on the journey to foster a learning organization. The first is a caution not to be naïve about the need for a positive learning orientation, expressed as a willingness to collaborate with others for mutual learning, and being able to do so with adequate resourcing, in terms of time, tools, and rewards.

The second caution is that even with positive learning orientation, motivation barriers and levers need to be considered. Lowering the amount of effort required to contribute to organizational learning, and increasing perceived benefits of this participation may be needed. Moreover, if changes in work

practices are being planned, including stakeholders early can increase readiness. If employees can express in their own words the expected value of implementing a change, that is evidence that double-loop learning is taking place.

The third caution is to be sensitive to existing attitudes that may not be salient until they are challenged by incongruent changes. Those attitudes may be reinforcing the status quo simply because it is familiar and stable. The status quo itself may reflect inequity that impairs participation in collaborative learning activities at work.

The fourth caution is that while all these dimensions need to be considered simultaneously to foster organizational learning, they may also interact with each other in ways that cannot be anticipated: a change to one may have unexpected consequences among the others. For example, while CoPs may encourage knowledge sharing, employees who do not see a clear benefit to this activity, according to the Principle of Least Effort, may not deem this worthwhile. Alternatively, the implications of new insights made possible by double-loop learning may trigger cognitive dissonance and rejection of that knowledge, based on conflict with the status quo as predicted by System Justification Theory. In another scenario, a new motivation to act to reduce cognitive dissonance may be hampered by employee inability to enact change suddenly, as predicted by the Transtheoretical Model.

Such interactions imply an unpredictable complex system, and therein lies a trap: the fruits of organizational learning may suggest changes to work practices; these changes themselves may then unexpectedly interfere with further organizational learning. Seen this way, organizational learning could seem both elusive and fleeting. Part 2 provides an exploration of how to design change in complex environments.

Managers who wish to measure their employees' orientation to a learning organization may wish to follow the example of Korn, Chandler, and Marzec (2021), who devised and tested a 26-item learning organization questionnaire based on six dimensions of a learning organization: reflecting on one's work, seeking feedback from colleagues, sharing knowledge, collaborating with colleagues, experimenting, and aspirational thinking. Conducting this quantitative measurement may be a very useful exercise to identify strengths and weaknesses, as well as to serve as a baseline for future measurement of improvement. However, whereas high scores are easy to interpret, low scores will reveal little about underlying obstacles, barriers, or problems. The six theories reviewed here provide a set of qualitative lenses that can be used as a follow-up to a questionnaire, to explore and explain why employees may be reporting low learning organization orientation.

## **PART 2 – TOWARDS IMPROVING ORGANIZATIONAL LEARNING**

### **Project Complexity and Project Failure**

The identification of complexity as a cause of failure can be traced to the work of Walter Shewhart, an engineer at Bell Labs in the 1930s. Shewhart suggested that the increasing complexity of engineering projects made failure increasingly likely, because of unanticipated consequences. He proposed a new development method for the design of systems of many interacting parts, that became known as “Plan-Do-Study-Act” (PDSA). The essence of PDSA applied to design is to be *incremental* and *iterative*: implement a piece of the project; test and analyze; revise and add another piece; test again. The wisdom of PDSA is simple: for a system sufficiently complex, to design and implement it all at once would risk serious and expensive mistakes because of unexpected interactions between components.

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Shewhart and those who continued his work were focused on engineering problems, not human social systems like organizations. However, an iterative approach to dealing with complexity did migrate from systems of parts to systems of people. Organizations, as systems of people, are complex. They consist of many structures, processes, practices, and interactions. In the field of project management, Dörner (1996) extended Shewhart's thinking by explicitly connecting complexity and failure in large, human-centred systems: unexpected interactions and outcomes characterize complex systems. As Dörner puts it, trying to solve one problem at a time, ignoring system effects, leads to failure.

Dörner's warning is relevant to the complex setting of an organization populated by individuals and their respective psychological environments: humans are to organizations as components are to a mechanical system. Introducing change in organizations can have countless unintended system-effect consequences suggested by the theories reviewed above. These include creating conflict with latent attitudes, exacerbation of inequity, inadvertent additional burden on learning activities, or threatening stability. For example, consider launching a CoP program. Who gets to participate, and on what basis? If adequate time and resources are to be allocated, who fairly shoulders the burden of work displaced by this new activity? Might there be resistance from those excluded, if it feels destabilizing to their job security? The theories reviewed here collectively provide a window into the complexity of human social relations that permeate groups of employees engaged in knowledge work. By no means does it constitute a complete inventory of organizational psychology. However, even this partial view of six theories is sufficient to reveal considerable complexity along with the prospect of interactions among them. If improving organizational learning can seem elusive, system effects among individuals may be the culprit. Moreover, because every organization is unique, there can be no generic, ready-made approach to deal with this challenge. Lacking an all-purpose formula to become a learning organization, what, then, is the way forward?

The answer may be found in a fundamentally different way of thinking about business planning. Management scholar Roger Martin (2009) applied Shewhart's and Dörner's systems logic to the design of business ventures, explaining why large business projects, and even businesses themselves, fail so frequently: corporate decision-makers decidedly prefer a complete, hardened business plan to an iterative approach where numerous and unpredictable changes are to be expected. Martin argues that in seeking success, businesses have been choosing a losing strategy. To succeed, argues Martin businesses need to embrace small-scale experimentation to try alternatives. In short, organizations need to embrace design thinking in order to grow and evolve.

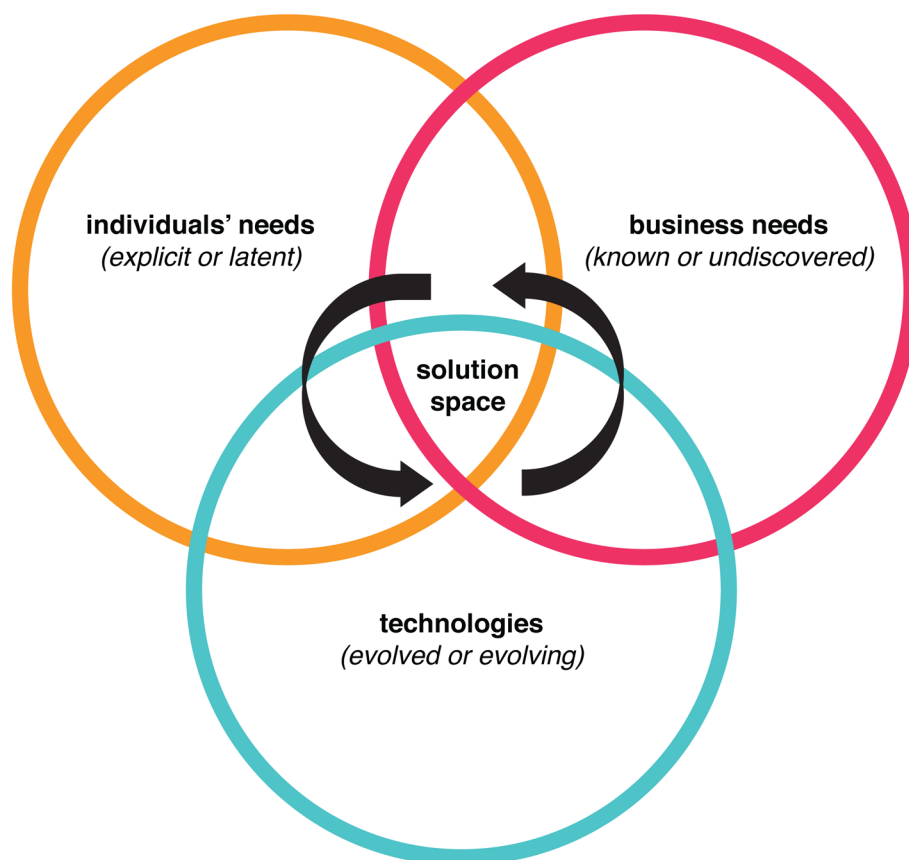
## **Design Thinking**

The great management theorist Herbert Simon popularized the new design science that was being developed by scholars at Cambridge and elsewhere, in the late 1960s (Simon, 1969). One foundational concept in design science is *abductive reasoning*. Deductive reasoning begins with general principles and arrives at a specific instance of what *must* be correct. Inductive reasoning begins with a specific instance and seeks to generalize this to what *ought* to be correct. Abductive reasoning involves generating a set of alternatives and empirically working out what *might* be most correct, suitable, or at least workable. Abductive reasoning involves successfully fitting alternatives, and watching for both expected and unexpected outcomes.

In proposing that businesses adopt a design thinking mindset, Martin (2009) embraced the design thinking logic articulated by Tim Brown, CEO of the design giant IDEO: "Design thinking is a human-

centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success" (Brown, 2009). The three dimensions identified by Brown can be represented in a Venn Diagram (Figure 2), to illustrate their mutual interaction. Using this as a mental model for designing solutions, successive efforts can be reviewed and adjusted in turn. An iterative trial and error process ends when a solution reaches the centre: an ideal where all three dimensions are accommodated. This succession of effort embodies abductive reasoning.

Figure 2. Three interacting dimensions of design thinking



The benefit of abductive reasoning to plan change in an organization is that it does not require complete anticipation of all interactions and outcomes: outcomes are not assumed, they are *observed*. Experimentation continues until positive outcomes are seen. These three dimensions can be described for the hypothetical example of trying to foster CoPs. The **business agenda** might define a range of possible types of problems or knowledge development that the organization needs; some may work better than others. The **technologies** to be used to support the CoPs may vary from in-person to simple email, to complex knowledge portals; some may work better than others. The needs of individuals, which can be parsed using the theories presented earlier, may be wholly or partially met, or not met at all. Most



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importantly, a change in any of these – meeting an individual’s needs, selecting a particular technology, or focusing on a particular business topic, might have significant effects on the other two. A CoP to foster internal expertise on the organization’s competitive landscape may work very well, when supported with an online knowledge repository, and only with significant participation by senior staff. Or it may be a different problem, different membership, and a different technology that works. The point is that success is *discovered* through iterative effort, not anticipated through careful planning. This process of discovery through iterative effort is known as prototyping.

## **Prototyping the Learning Organization**

Within the field of design, the process of abductive reasoning – evaluating alternatives to answer the question “what *might* be?” – is accomplished by building and evaluating prototypes or mock-ups. Product prototypes can be very crude or “low fidelity,” such as using a block of wood to prototype an acceptable size of a new smart phone. This approach would let designers evaluate whether the proposed size fits into pockets, falls out of pockets, whether it is comfortable in the average sized hand, and so forth. Product prototypes can also be of much higher fidelity, incorporating multiple real features in order to more closely resemble the intended design. The higher the fidelity, the more feedback that can be wrung from it. It is common for prototyping to begin with low fidelity, and gradually increasing with each iteration.

Prototyping has long been associated with physical products. However, less tangible things can also be prototyped, such as business processes and work structures. The less tangible the object of design, the more helpful prototyping can be as a tool to work through complex problems and situations. Prototyping new ways of working can enable organizations to iteratively experiment with structures and processes, to activate change levers and mitigate obstacles among employees. Instead of expecting businesses to hatch fully formed plans that cannot anticipate unexpected outcomes, small-scale initiatives can be trialed and analyzed for feasibility and barriers on many levels. Prototyping work can consist of implementing a change in one area of an organization for a set period, with stakeholders actively engaged in assessing consequences and outcomes. If compatibility problems with the psychological environment of individuals are uncovered and analyzed, the implementation can be adjusted in an iterative fashion to accommodate.

The leading global design firm, IDEO has introduced prototyping to many organizations to help them think through organizational learning and change. In this context, prototyping incorporates three key objectives, which are 1) building to think, 2) learning faster by failing early and often and 3) giving permission to explore new behaviours (Coughlan et al., 2007). These are powerful objectives in that they bring a sense of letting employees brainstorm, discuss and get creative to produce a “material manifestation” of their idea or proposal.

Through the support provided by IDEO, prototyping has worked for many organizations. For example, a cancer centre improved its chemotherapy patient experience by starting with the idea of an informational binder and later discovered that a set of conversation cards worked better for their patients (Coughlan et al., 2007). Likewise, a postpartum unit in a healthcare organization achieved standardization of their process through a checklist, allowing experimentation, shared clinical understanding and input from diverse patients (Coughlan et al., 2007). These innovations represent organizational learning, enacted through an iterative prototyping process.

The great importance of prototyping, openness towards experimentation, and dialogue facilitation is clearly captured by Sidani and Reese (2020):

*If an organization is going to learn, the people who work in that organization have to have the freedom to try out different things, different ways of interacting with the customer, different products, different ways to do the work, and it is through doing that, trying out, and reflecting on it that they are able to learn. (p. 262)*

Prototyping the learning organization is also exemplified by the work of Jaaron and Backhouse (2016) to develop their Vanguard Model to operationalize double-loop learning in service-based organizations through iterative experimentation. This three-stage cycle encompasses measurement, planning, and doing, together with a shift in management style from the traditional form of command-and-control to a coaching model, empowering employees to voice ideas and engage in experimentation.

The contemporary use of design thinking and prototyping in knowledge management makes it clear that they are not meant to be used in a top-down fashion. Rather, they are best enacted collaboratively, with genuine participation from a wide range of employees. To reap the benefits of design thinking and prototyping requires a participatory approach and engaged feedback from across diverse groups and levels across the organization – not just managers and executives.

## **FUTURE RESEARCH DIRECTIONS**

Three future research directions clearly emerge from this chapter. The first, and perhaps the most pressing, is to consider what the success metric should be for something so intangible as “organization learning”. Edmondson et al. (2019) presented a validation study of the Learning Organization Survey, with three dimensions: learning culture, learning structure, and leadership support. However, this stops short of answering the question: how much does investing in developing a learning organization improve the bottom line? A set of action research projects at different organizations might help illuminate the relationship between learning organization as input and organizational performance as output. The ability to demonstrate real value may be a prerequisite for “learning organization” to enter the boardroom lexicon.

A second area for future research would be the application of the theories presented here, which have not been associated with knowledge management and organizational culture, and so have not yet been tried. Small experiments to improve workplace knowledge use could be crafted to lever the Principle of Least Effort or Cognitive Dissonance, for example. If the focus of an intervention is a specific work process for a specific occupation, it can be relatively easy to identify opportunities to increase perceived benefit, reduce perceived effort, or induce a misalignment of attitude and behaviour to trigger change. Experimenting with such a strategy on a small scale would be consistent with the benefits of the iterative, design-thinking approach presented above.

Finally, there are forensic research opportunities for some of the theories presented here, to help explain the high rate of failure of so many knowledge management projects, as noted at the beginning of this chapter. System Justification Theory and the Transtheoretical Model both provide compelling qualitative scaffolds for exploring ways in which the invisible psychology of individuals represented barriers to genuine engagement in change. Failed knowledge management projects receive considerably less publication attention than successes do, although some have been described in the literature (Liebowitz, 2016). A research focus on identifying causes of failure would be valuable because more can be learned from failure than success: enacting this wisdom is a hallmark of a learning organization.

## CONCLUSION

This chapter began with the observation that investment by an organization in digital infrastructure alone does not result in a learning-enabled organization, and that change management efforts to improve information and knowledge use are not reliably successful. One main impediment may be the hidden complexities in the psychological environment of the individuals who collectively make up an organization. This complexity is evident in the six theories that demonstrate how orientation to learning, motivation to act, and capacity for change are complicated and problematic, conflicting and overlapping.

The problematic psychology of the individual in a workplace could seem discouraging for those trying to foster a learning organization. There are no glib mantras, generic solutions, or transferable best practices, because the complex social context is unique in every organization. Yet there is great value in becoming a learning organization, to embrace a virtuous cycle of openness to learning, one that in turn spawns adaptive change and still more learning. The path towards a learning organization is one rooted in design thinking and business prototyping.

This chapter did not seek to provide a one-stop, how-to manual for prototyping the learning organization. Such an endeavour would require its own book. Holtzblatt and Beyer (1998) do in fact provide that very book, along with consulting services to help organizations design effective work structures and processes. Evolving towards a learning organization is a monumental and long-term undertaking, and it is not clear that most organizations can make significant progress without outside help. Instead, the focus here has been to persuade the reader to start thinking differently about the relationship between people, work, tools, and the goals – both explicit and implicit – for nurturing organizational learning. In the parlance of double-loop learning, the emphasis here has been on the “why”: questioning the status quo values and assumptions, in order to get at the underlying problem of nurturing a learning organization.

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## KEY TERMS AND DEFINITIONS

**Cognitive Dissonance:** The unpleasant mental discomfort when an individual is faced with one or more contradictory beliefs, values, ideas, or actions. The individual attempts to realign their internal psychological processes to decrease dissonance. This can take the form of resisting actions that are inconsistent with attitudes, or forming attitudes that are consistent with actions.

**Community of Practice (CoP):** A self-organizing group of people who collectively decide to engage in shared learning with respect to a common profession and body of knowledge. A CoP facilitates mutual professional learning and provides opportunities for knowledge exchange. Members of a CoP rely on mutual interactions (face-to-face or virtually) to build a sense of community for problem-solving and collective learning.

**Design Thinking:** An iterative, cognitive, and strategic process that emphasizes abductive reasoning: successively trying different solutions in order to choose among them. The three dimensions of design thinking are the needs of individuals, the possibilities of technologies, and the business sustainability of solutions. Because these three dimensions interact, a change to one of them may have unexpected effects (good or bad) on the other two. Design thinking can be applied to the design of work practices and the design of businesses, as well as the design of objects.

**Double-Loop Learning:** The key feature of double-loop learning is a focus on “why” in the course of solving problems. In contrast to single-loop learning, a basic form problem solving defined by task completion, double-loop learning questions underlying assumptions and values to identify underlying issues that need to be addressed. Double-loop learning is vital to organizational learning.

**Organizational Learning:** The capacity of an organization to enact change based on experience, such as the acquisition of new knowledge or changes in the external environment. Organizational learning includes how knowledge is situated, interpreted, used, exchanged, and altered across multiple levels across the organization. The span of learning can encompass processing new information to adjust organizational strategy, making decisions, as well as changing behaviour to remain competitive.

**Principle of Least Effort:** Developed to explain patterns of language use, it also broadly applies to human behaviour because of its powerful and simple tenet: every action is appraised as a ratio of perceived benefit to effort. Thus, a desired behaviour can be motivated either by decreasing the effort, or by increasing perceived benefit of engaging in that behaviour.

**Prototyping:** A design thinking technique which involves the iterative creation of representations, models, and small-scale implementations of ideas. Physical objects can be prototyped by building crude or sophisticated mock-ups. These can be tried, the design modified, and the process repeated. Business structures and processes can also be prototyped, by trying them briefly, or in one area of the organization, to gauge success, modify the design, and try again.

**Systems Justification Theory:** Explains why individuals will defend and/or justify existing systems even if such systems are unfair or disadvantageous. The rationale for individuals supporting flawed systems is rooted in a perception of reliance on the system, and a desire to maintain stability and order.

**Transtheoretical Model of Change:** Describes the gradual process of becoming emotionally and cognitively ready to engage in sustained change. The model describes five phases: precontemplation, contemplation, preparation, action, and maintenance. The phases are not necessarily linear, and temporary relapse to a prior stage is common.

# Chapter 13

## Strengthening an Organizational Knowledge-Sharing Culture

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### **ABSTRACT**

*To improve knowledge sharing at the video game company Ubisoft, the knowledge management team investigated the key elements comprising a knowledge sharing culture. A knowledge sharing culture circle outlining both enablers and barriers to effective knowledge sharing is constructed. The five enablers—the nature of knowledge, opportunities to share, motivation to share, the culture and work environment, and trust—should be supported to strengthen knowledge sharing. At the same time, the barriers hindering efficient knowledge sharing at Ubisoft—confidentiality, knowledge hoarding, competition, and lack of prioritization—must be addressed to leverage the benefits of shared knowledge. The interconnected nature of both the enablers and the barriers must be taken into account when constructing initiatives intended to strengthen a culture of knowledge sharing. Five initiatives are described: a new content management paradigm, strengthened internal job communities, redefined internal security policies, objectives and key results on knowledge sharing, and targeted training.*

### **INTRODUCTION**

How many upper-level management platitudes and free coffee mugs does it take to improve knowledge sharing?

When asking the Knowledge Management (KM) team at Ubisoft, the answer is...well, there is no answer. In the case of the video game company Ubisoft, the very premise of the question is wrong.

The KM team's mission is to enable employees to leverage content and knowledge to perform at their best. To do so, the KM team delivers company-wide solutions and programs intended to facilitate internal collaboration and knowledge reuse. Nevertheless, multiple issues in terms of creating, sharing, and reusing knowledge are identified.

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Therefore, a more appropriate question is: With the many tools, processes, and platforms in place, why is knowledge sharing not happening more widely or successfully at Ubisoft?

Even with more perks for sharing, a revamped best-in-class internal social network, and an enterprise search engine to rival Google, barriers to knowledge sharing will still exist. The “right” work environment and a culture based on trust are essential to overcome these barriers. Culture affects everything in the organization and can, in many ways, have a more significant impact than tools, strategies, and executive visions. To create successful knowledge sharing and reuse conditions, conscious efforts to strengthen the company’s organizational culture need to be implemented.

This case study will outline how the KM team at Ubisoft identified specific enablers and barriers to knowledge sharing and then defined five initiatives intended to address them.

The initiatives are in the midst of being conceptualized, tested, and adjusted. While it is too early to conclude their success or failure, the goal of this chapter is to lay out the vision and details of the five proposed initiatives to boost enablers and remove barriers to knowledge sharing at Ubisoft.

All organizational cultures, enablers, and barriers to knowledge sharing are different, so rather than a prescriptive model, the initiatives described should be taken as examples.

## **BACKGROUND**

### **Knowledge Sharing Issues at Ubisoft**

The Ubisoft KM team’s mission is to enable employees to leverage content and knowledge so they can perform at their best. To do so, the KM team delivers company-wide solutions and programs intended to facilitate internal collaboration and knowledge reuse, for example, via internal social networks, documentation ecosystems, governance policies, enterprise search, and more.

More often than not, the KM team has witnessed that while the services and solutions delivered were of a high standard, they did not have the intended impact. In the past, the KM team has developed documentation ecosystems for new production teams. Six months later, when the KM team checked in, the ecosystem would be one big mess with duplicate content, no structure, essential knowledge missing, low user satisfaction, and a limited amount of sharing taking place.

Other relatively common examples of an inadequate knowledge sharing culture have been witnessed when teams decline to document or share their knowledge with other teams. Or when teams prefer starting from scratch by developing their own assets or knowledge, either because another team refused to share, because the team is more comfortable doing everything themselves, because it is too complicated, or just impossible to get access to the knowledge.

A global enterprise-wide survey is sent out every second year to all employees at Ubisoft. Some questions in the survey centers around collaboration, communication, and information sharing. Answers to these questions illustrate that employees highlight issues with lack of sharing, insufficient documentation, and silos between production teams as problematic. The same conclusions are drawn from user interviews and smaller KM surveys: Employees recognize the issues with knowledge sharing, but they either cannot or will not take the responsibility to improve it on their own.

Conclusions of a master thesis (Rose, 2012) on what influences knowledge sharing at Ubisoft showed that the identified barriers also existed almost ten years back. That indicates that some issues are deeply rooted in the Ubisoft culture and should be addressed if anything should change. In the “Main barri-



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ers to knowledge sharing at Ubisoft” section, examples and reasons for the most dominant barriers at Ubisoft will be detailed.

With all of this, it can be determined that great customized tools and well-defined content strategies do not have the expected impact, and KM services and solutions will never live up to their full potential. The KM team has realized that what is needed is an underlying culture that supports more and better knowledge sharing at Ubisoft. For that reason, the ambitious goal of strengthening a knowledge sharing culture has started at Ubisoft.

### **The Knowledge Sharing Culture Circle**

To understand the knowledge sharing issues at Ubisoft, the KM team constructed a theoretical framework based on existing literature and the specificities of the company itself. This framework is the knowledge sharing culture circle.

The circle comprises five enablers that are perceived as crucial for effective knowledge sharing to happen. The five enablers are:

- Trust.
- Nature of knowledge.
- Opportunities to share.
- Motivation to share.
- Culture and work environment.

While each enabler can be understood independently, the visual representation depicting trust as the element underpinning each reinforces the reality that the enablers affect one another. For example, the motivation to share can increase if there are good opportunities to do so. Whether explicit or tacit, the nature of knowledge is a key factor in creating opportunities to share. If employees feel trusted and valued as an outcome of the organizational culture and work environment, they will be more motivated to share their knowledge. Trust is represented throughout the circle because it is essential for knowledge sharing to happen (Evans, 2012). Trust is a prerequisite for a knowledge sharing culture as well as the binding agent that creates positive synergies between the other enablers.

To strengthen the knowledge sharing culture at Ubisoft, all five enablers must be considered. Focusing only on individual enablers will not have the same impact and might be counterproductive given their synergistic relationship.

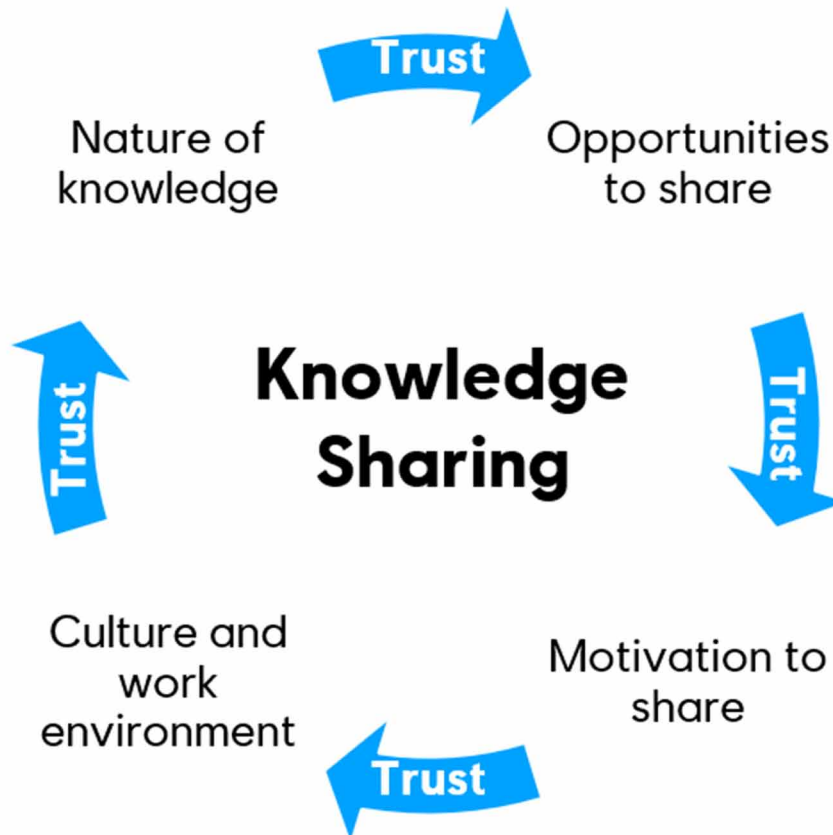
The following will describe each enabler and how they are observed at Ubisoft, using Ipe’s (2003) and Evans’ (2012) definitions as both a foundation and inspiration.

#### **Trust**

A common definition of knowledge sharing is a mutual formal or informal exchange of ideas among individuals or groups (Yeo & Dopson, 2017). Therefore, knowledge sharing can be situated as a social behavior. In the domains of psychology and behavioral science, on which knowledge sharing theories are built, trust is identified as a necessity for social behavior (Evans, 2012).

Evans (2012) identifies three requirements for knowledge sharing to take place:

Figure 1. The knowledge sharing culture circle



- The knowledge source must be willing to share.
- The knowledge receiver must be willing to receive.
- The knowledge receiver must perceive the knowledge shared as being useful.

These requirements build upon trust. If trust is absent between the one sharing and the one receiving knowledge, the chance of any positive knowledge sharing taking place is minimal. Plus, without trusting the source, whether a person or a document, it is unlikely the knowledge will be perceived as valuable.

Mayer et al. (1995) define trust as the willingness to be vulnerable to the actions of another party based on the expectations that the other party (being a document or a person) will deliver something important or of value. Trusting someone or something is a calculated risk because it is impossible to monitor or control the other party.

Trust can be considered as integrity-based and ability-based. Integrity-based trust describes when the trustor (the person doing the trusting) perceives that the trustee (the person being trusted) operates from a set of principles that the trustor finds acceptable. This type of trust is afforded to a friend, family member, or close colleague who shares similar values (Evans, 2012).

Ability-based trust is the group of skills, competencies, and characteristics that enable a person to have influence within a specific domain. For example, doctors are trusted not because their patients necessar-

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ily share the same values or know each other particularly well. Instead, a doctor is trusted because of his title and what that encompasses, namely requisite schooling and experience (Schoorman et al., 2007).

If trust is lacking in an organization, it can be replaced by control. Control might have a negative connotation, but it can be used in a constructive way to generate trust. By implementing a control mechanism, habits and norms can be created, which can positively affect the culture and generate trust in the long run (Evans, 2012). By implementing a control mechanism such as mandated sharing checkpoints or cross-pollination of teams, positive habits and norms around knowledge sharing and reuse can be created.

At Ubisoft, the ability and integrity-based trust, in addition to the prerequisites for knowledge sharing, come into play. First, the level of trust in internal documentation is problematic in several regards. Not only is internal documentation on a given subject challenging to find, but employees may not be sure that it exists at all. If documentation is located, it is not always clear if the information is accurate, relevant, and up to date. In other words, its very trustworthiness is uncertain.

At one single production team at Ubisoft, which can include up to 1000 employees, it is impossible to have social ties to everyone; even a percentage can be difficult. When employees do not have established or close relationships, it is much more challenging to be vulnerable, and trust is harder to cultivate.

A shared vision is an essential element in both knowledge sharing and generating trust-based relationships. When employees work together towards a shared vision rather than working separately with different goals, there is a better chance of establishing trustworthy relationships despite differences in background or culture. Along with a shared vision, a shared language is an important element in trust-building (Abrams et al., 2003). The notion of a shared language is related to the second enabler, the nature of knowledge.

### **The Nature of Knowledge**

There are close to 100 different nationalities represented at Ubisoft, and the two most spoken languages are English and French. However, in some cases, at Ubisoft studios in Asia, neither English nor French is spoken by all. This can naturally cause some challenges in terms of communication and sharing knowledge.

A shared language is also about shared semantics. Different job disciplines use different terms or the same terms differently. Even the same job disciplines can apply different meanings to the same term depending on the project.

The nature of knowledge also refers to how knowledge can be both explicit and tacit. Explicit knowledge can be relatively easily codified as information (i.e., documented or spoken) and shared via different channels (i.e., internal intranet, in a chat, or via training). Tacit knowledge is more intuitive knowledge and know-how that is rooted in gained experience or a particular context. This type of knowledge is difficult to formalize or codify and consequently harder to share. However, tacit knowledge can be shared in alternative ways such as storytelling, mentor programs, or cross-pollination. In the SECI model, where knowledge is externalized as information in order to be potentially internalized as knowledge by others, it is clear that knowledge sharing is a dynamic process (Nonaka & Takeuchi, 1995).

While an in-depth discussion of the exact nature of knowledge is out of the scope of this chapter, for this case study, knowledge is defined as information that has been retained with an understanding of the significance of that information. Knowledge includes something gained by experience, study, familiarity, association, awareness, or comprehension (Evans, 2012).

When analyzed within a social constructivism optic, in which cognitive development occurs socially and knowledge is constructed via interactions between people, the importance of the nature of knowledge

is even more evident. The world is understood and communicated via language, and different languages lead to different cognitive systems for understanding, thereby shaping how the world is interpreted and what knowledge about the world is created. Having a shared language makes it easier to express thoughts, share knowledge, and ensure that the receiver of the knowledge understands it as the source intended.

For a knowledge sharing culture to thrive, the different types of knowledge need to be shared in the appropriate formats and contexts. Therefore, an organization must put in place the proper means and opportunities to best share knowledge, whatever its nature. This leads to the third enabler, opportunities to share.

## **Opportunities to Share**

While having explicit knowledge rather than tacit can go a long way to increasing opportunities to share, many other factors are needed to create valuable knowledge sharing opportunities. What types of knowledge sharing exist already? Do they tend to be more formalized or ad hoc, dependent on the timing, context, and individuals involved? Are any physical structures in place that make it harder to share knowledge? Are employees working in an open office together or distributed across different locations? While some opportunities can happen organically, others must be cultivated. As a result of working from home during the Covid-19 pandemic, employees who used to work on-site are now more physically isolated from one another. This reduces opportunities for informal tacit or explicit knowledge sharing. In such a context, standardized channels and platforms for sharing knowledge are crucial.

The processes and platforms used for sharing must be intuitive and straightforward to use. Ideally, there should be a clear benefit or motivation to share for the employees using these platforms. One opportunity that can motivate sharing is templates for knowledge documentation that are easy to use. Templates make it easier to capture knowledge because the employee does not need to think about format and layout. A template can help make the knowledge being shared seem more trustworthy by virtue of its adherence to an accepted internal standard.

Of all the enablers, opportunities to share is probably the most prominent at Ubisoft. Whether informally or formally, in person or virtually, Ubisoft counts a multitude of ways to share. Employees in the studios have many areas to meet and share either casually (lounge areas with coffee machines and watercoolers) or more formally (in meeting rooms or other organized conversations in the open office spaces). Internal knowledge is also shared in structured and unstructured ways: via original content shared by different teams in articles, videos, and interviews, as well as internal conferences where different job disciplines meet to share and inspire each other with best practices and lessons learned. Teams are pretty autonomous in creating internal sites to house and share knowledge. Ubisoft counts thousands of collaborative workspaces built on either Confluence or SharePoint; local intranets for office-related information; department showcase sites to highlight services; as well as the aforementioned internal social network with job and interest specific groups. This is in addition to multiple internal tools for content management, including shared network folders, Jira for task management, Perforce and GitLab for source code, and other internally developed technologies.

When it comes to platforms, there is no shortage of opportunities to share at Ubisoft! Paradoxically, the abundance of channels to share weakens the actual knowledge sharing activities at Ubisoft. Since it can be too complex to determine where to share knowledge, employees may choose not to share at all. If they do share, employees may do so on a platform that is not used by many or is not accessible to those who could genuinely benefit from it. If both the advantage of sharing knowledge is not clear

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for the source and it is complicated as a receiver to access it, there is a subsequent negative effect on an employee's overall motivation to share.

### **Motivation to Share**

While all enablers affect one another to a certain degree, the motivation to share is particularly sensitive to the other four. If the nature of the knowledge makes it difficult to share; if there are no appropriate or recognizable opportunities to share or platforms on which to do so; if there is no trust in the receivers; or if the culture and work environment does not support knowledge sharing, the motivation to share will be low.

At Ubisoft, opportunities to share have always been a priority. KM has also focused on the nature of knowledge by developing not only formats that make it easier to convert tacit knowledge to explicit but also enterprise taxonomies and an internal lexicon to reduce barriers further. But a lesser focus has been given to the motivation to share.

Interviews and surveys at Ubisoft have shown that in most cases, employees require some sort of motivation to share their knowledge. That exact motivation can vary depending on the employee, their relationships, the topic, support from management, and other factors. The motivation to share is psychological and should ideally start with the employees themselves. However, different mechanisms can be put in place to help cultivate this motivation.

If instead of seeing knowledge as power, which can lead to knowledge hoarding, knowledge is seen as reciprocity, employees will see the interest in sharing their knowledge. Relationship building, which is closely linked to trust, and rewards or recognition for sharing are factors that can motivate knowledge sharing (Ipe, 2003).

An example of the cross-section between motivation and opportunities to share can be seen in the different sharing channels available at Ubisoft, each of which attracts employees who are motivated by different factors. On the one hand, the more social media-type platforms such as Ubisoft's internal social network and local intranet sites are used for a large variety of knowledge sharing, from corporate-focused messaging to work or non-work-related topics intended to reach a broader and often anonymous audience. This contrasts with strictly work-oriented platforms intended for tasks and production-related documentation. Whereas users of the first type of platforms are typically motivated because they have a clear mandate to communicate information, those who share on the second type are often uncertain of the receiver and utility of any knowledge shared. Common remarks from employees sharing on these platforms are that they are often unsure of their exact audience; whether the documentation created is relevant for anyone; and how many (if any) employees are benefiting from what they produce. On the more social or communications-focused platforms, users are well-identified. Like LinkedIn or Facebook, these tools allow users to post from their profile. On work-related sites, however, the author of a document is not overly visible, and this relative anonymity also affects individual motivations to share.

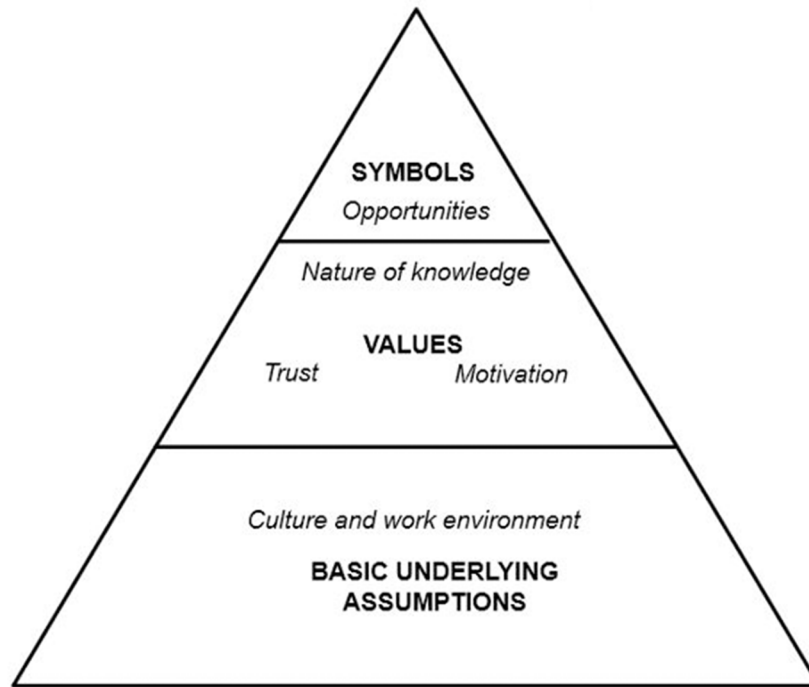
### **Culture and Work Environment**

The way organizational culture is understood and used in this chapter is based on Schein's (2010) iceberg model containing three layers, with symbols as the visible tip, values as the intermediary level, and basic underlying assumptions comprising the proverbial "hidden" depths.

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In the iceberg model, the work environment can be seen as the basic underlying assumption that the other enablers (nature of knowledge, opportunities to share, motivation to share, and trust) are built upon and affected by. If the basic underlying assumptions in the culture do not support knowledge sharing, they will most likely work against any conscious initiatives to share knowledge. Therefore it is vital to expose the cultural underlying basic assumptions affecting knowledge sharing to analyze their impact and ensure they align with the targeted state.

Figure 2. The iceberg model (Schein, 2010) with the knowledge sharing enablers: opportunities to share, nature of knowledge, trust, motivation to share, and culture and work environment



The model illustrates where the different enablers can be placed following the iceberg model. The nature of knowledge could be separated into tacit and explicit knowledge since the latter can arguably be seen as symbols. Overall, any proposed knowledge sharing initiatives should be rooted in the culture and work environment to have long-lasting effects.

### *Culture at Ubisoft*

Talking about “one culture” at Ubisoft is not possible, as it is a multinational enterprise with approximately 20,000 employees comprising 100 different nationalities spread over five continents. There are substantial cultural differences between, for example, working in the marketing department at the Ubi-

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soft studio in San Francisco, USA, versus being a senior programmer at the Ubisoft studio in Mumbai, India. Nevertheless, some characteristics of an overall representative culture at Ubisoft can be described.

Ubisoft Entertainment SA is first and foremost a video game company (Ubisoft has also published books, created TV shows, and so far, two movies). Founded in France in 1986, Ubisoft has steadily grown over the years, whether by starting studios in new locations or by acquiring existing video game companies and integrating them into the larger Ubisoft entity. Needless to say, acquired studios have their unique work routines, traditions, and cultures that must coexist or adapt to the new relationship.

Even though Ubisoft today is a global company, it has a French core. The headquarter is in Paris, and a majority of top management are either French or speak French as their mother tongue. The founder of the company is still the CEO, Yves Guillemot. After resisting a hostile takeover tentative in 2016-18, Ubisoft has created an accompanying cultural narrative as independent, and this is further reinforced by the relative independence afforded individual acquired studios.

Ubisoft is an entertainment company combining strengths in both technology and creativity. Talented programmers come together with artists and designers to develop complex characters, stories, and worlds for gamers to spend hours in. Ubisoft is a creative company consisting of employees with a desire to create and develop.

Today games are being developed in studios in various countries in Europe, Asia, and North America. Studios vary in size, from smaller ones counting less than one hundred employees to the larger outposts with up to 4000. Each studio often has several teams working on different games as well as multiple different types of teams supporting the core productions. The studios collaborate when developing major games, with one studio acting as lead and up to four or five others supporting as co-developers.

Ubisoft gives the studios much freedom in terms of organization, processes, and strategies. The technologies used to develop games can vary a lot from studio to studio and from production to production. This culture of freedom regarding technologies and creativity is related to the overall flat and informal company structure. All of this is traditionally recognized as having a positive effect on creativity and employees' feelings of independence, which can lead to more innovation. When trying to implement enterprise-wide standards or consistent ways to share knowledge, however, the KM team faces the double challenge of the task itself and this decentralized environment, where uniformity is not as valued as creativity and difference. These challenges are part of the barriers to knowledge sharing at Ubisoft.

## **MAIN BARRIERS TO KNOWLEDGE SHARING AT UBISOFT**

Knowledge management literature is ripe with discussions and lists of the most common barriers to knowledge sharing. Hubert and Lopez (2012) sum up the barriers as the following ten: relationships, awareness, culture, time, trust, distance, measures, sponsorship, knowledge hoarding, and experience.

All of these can be observed at Ubisoft, and they indeed play into the challenges in effective knowledge sharing. To tailor knowledge sharing initiative to the specific organizational context, the KM team focused on the four most dominant barriers at Ubisoft:

- Security.
- Knowledge hoarding.
- Competition.
- Lack of prioritization.

Like the enablers in the knowledge sharing culture circle, the four barriers are also closely related and affect or even enforce each other.

## **Security**

In the video game industry, there is a high level of security to protect a company's competitive advantage, and Ubisoft is no exception. The company has detailed policies for what can be shared with which audiences, both within and outside of the organization. This may contribute to an overly secretive and protective culture that translates into a reticence to share or confusion about what information employees can and cannot share. From time to time, there are stories about external leaks of information. This leads to investigations and internal reminders of the rules and consequences of sharing confidential information. Added to this picture are messages from Ubisoft legal teams stating that all information should be considered insider information by default. Furthermore, Ubisoft already has silos between individual studios, productions, and job functions. This additionally affects employees' opportunities to share.

All of this leads to understandably cautious attitudes from employees when it comes to sharing. The complexity of respecting multiple information security policies combined with the potentially severe consequences for even unintentionally violating one accidentally creates a "better safe than sorry" mentality when it comes to sharing knowledge. This illustrates the extent to which an organizational culture valuing strict confidentiality and security has the potential to interfere with the sharing of non-confidential knowledge unintentionally. This culture of security and confidentiality leads to knowledge being shared between a select number of employees and subsequently suspends non-invitees. These employees are often in higher positions, have been at Ubisoft longer, and have well-developed networks of colleagues with whom integrity-based trust is already established (Rose, 2012).

Security policies are important and should, of course, be respected. But internal research conducted at Ubisoft suggests that knowledge leaks were both fewer and less severe than feared (Rose, 2012). Furthermore, there are no indications that more internal sharing leads to more leaks. Nevertheless, stories about leaks and their consequences may take on unwarranted importance and thus become further embedded in Ubisoft's culture. Every organization has assumptions that are shared and taken for granted. One type of assumption is stories, which are past events that are still talked about (Johnson et al., 2012). Even though the specific event that created the story is long forgotten, the story is deeply grounded in the organization because organizations are more likely to remember interpretations of events rather than the event itself (Hajric, n.d.). This makes the mitigation measures to prevent leaks and insider information a barrier for knowledge sharing.

## **Knowledge Hoarding**

Knowledge hoarding is about status and the fear of losing status. When knowledge is seen as power, employees can tend to hoard it rather than share it as a means to preserve their power. It can be argued that when an employee's knowledge becomes their main asset to the organization, they are more reluctant to share it. By sharing knowledge, they risk diluting their value in the organization because they will no longer have a monopoly on it and will effectively have "given up" a certain power (Trees & Harper, 2020). There are concrete examples of this at Ubisoft. Employees who keep essential knowledge to themselves are rewarded with a form of increased power, whether implicitly or explicitly, via their recognition as



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an expert with unique knowledge. To ensure that employees who possess unique or valuable knowledge stay with the company, they are often rewarded, for example, by being promoted.

At the other end of the spectrum are employees who are unsure of themselves and their knowledge. This uncertainty can be based on a lack of trust or a fear of making a mistake in front of others or otherwise demonstrating a lack of knowledge. This can also lead to employees keeping their knowledge for themselves (Rose, 2012). The fear of sharing mistakes is not limited to less experienced employees in the organization. There are examples at Ubisoft of creative directors who are reluctant to share their original vision of a game because the final product is quite different from what was initially envisioned, illustrating the fear that this divergence could be seen as a failure.

Because Ubisoft is organized in multiple production teams, each of which forms a relatively self-contained individual unit, the “not invented here” syndrome can influence what knowledge is used. If it is not invented within the team, it may be deemed less trustworthy.

When the organizational culture positions knowledge as power instead of sharing as power, and when there are no incentives or recognition for sharing, knowledge hoarding will continue to be a barrier to successful knowledge sharing.

## **Competition**

Ubisoft is proliferating, both in terms of new employees joining the company and the number of studios being acquired. Despite a process of adaptation on the part of acquired studios to Ubisoft-specific processes and tools, each entity still preserves its unique elements and, to an extent, a specific organizational culture. For example, the studios keep their original names and logos. This is undoubtedly a wise decision in many ways; for example, it can help ease the transition for employees in the acquired studios and emphasize the value Ubisoft affords individual units in terms of a level of independence, decentralization, and by extension, creative freedom.

From a knowledge sharing perspective, however, it is essential to keep in mind the importance of a shared vision in cultivating the trust-based relationships which encourage the spread of knowledge. When teams are aligned around this shared vision, they can more easily work toward a common goal. At Ubisoft, individual studios enjoy a lot of freedom and autonomy; large-scale and prestigious game productions are assigned to studios, who understandably receive visible credit for having developed each game. Production teams' bonuses are based on the monetary performance of their game on the market. This organizationally flat structure, combined with a project-based bonus system and individual studio cultures, can negatively impact the perception that Ubisoft is one company working together on a shared vision. Consequently, a significant barrier to inter-project and studio collaboration is maintained. This aligns with Ipe's (2003) analysis of knowledge sharing in organizations, stating that in competitive environments where knowledge has a high commercial value, a dilemma about whether to share or not exists due to contradicting incentives.

There are various examples of projects not willing to share their knowledge with other projects because they are perceived as competitors who will potentially “steal” their ideas. In other cases, multiple projects can be working on the same concept without being aware of one another because the siloed organization prevents any cross-project knowledge sharing.

There are, of course, examples of projects successfully collaborating and sharing knowledge. To launch a game more quickly, some games will reuse assets created for other games, spending less time developing these components and therefore focusing more on innovation. Despite these examples, at

Ubisoft, “collaboration as the norm” is not a widely adopted mindset, and the culture tends to reinforce the potential downsides to sharing knowledge across projects rather than the benefits.

## **Lack of Prioritization**

Prioritization is primarily about making and taking the time to share knowledge. With so many other urgent tasks to prioritize when producing a video game, employees must see a value proposition of knowledge sharing to devote time to it instead of another task. Therefore, knowledge sharing needs to be both straightforward and supported by clear incentives. If the efforts needed for sharing knowledge seem too consequential in terms of time (or inconsequential in terms of benefit), the employees at Ubisoft are less likely to share. For that reason, it is crucial to ensure that employees can quickly and conveniently locate the right place to share information and that the process to document that knowledge is clear and straightforward. The many ways and opportunities to share at Ubisoft in terms of platforms and systems can make it overwhelming and time-consuming to share.

Technology teams at Ubisoft have indicated that a lack of dedicated time to create documentation is the biggest barrier to knowledge sharing. When employees do not have dedicated time to share their knowledge, it will not be prioritized. Furthermore, because employees are evaluated on parameters like technology development or game features developed rather than documenting knowledge, it is easy to see what they will choose to prioritize. Employees will tend to think they are too busy to share knowledge or that knowledge sharing is outside the scope of their job. On the contrary, knowledge sharing should be within the scope of most jobs. Incentives to share that are linked to career advancement should be the norm, rather than the opposite, in which employees are rewarded for knowledge hoarding. When productions are crunching or working overtime to ship a game within time, as is often the case in the industry, finishing game development is naturally prioritized above all else. Employees who spend time creating documentation in these critical stages will invariably spend less time on their primary or more urgent tasks. This can affect their performance evaluation and, to some extent, maybe even their career.

## **Synthesis**

The four barriers to knowledge sharing are interrelated and impact one another: security policies complicate the effort needed to share because employees are unsure of what can be shared with whom. This also reinforces existing silos between productions and further enforces the innate sense of competition. A competitive culture between projects can easily lead to knowledge hoarding, and when management does not incentivize knowledge sharing through either priority management or career opportunities, it is easy to see why employees do not make the extra effort required to share.

The table below summarizes the enablers and barriers discussed thus far, followed by KM’s proposed initiatives to address them. Despite the rows, the table should not be read as one enabler being linked to only one barrier and initiative. There are connections and interdependencies between them all, and each initiative, if implemented successfully, can have positive effects on multiple enablers and barriers.

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Table 1. Knowledge sharing enablers, barriers, and initiatives

Enablers	Barriers	Initiatives
Trust	Security	New content management paradigm
Nature of knowledge	Knowledge hoarding	Job communities
Opportunities to share	Competition	Redefine the internal security policy
Motivation to share	Lack of prioritization	Recognition for knowledge sharing
Culture and work environment		Training

## KNOWLEDGE SHARING INITIATIVES AT UBISOFT

Given the presence of multiple barriers, implementing the changes required for a true culture of knowledge sharing and reuse at Ubisoft seems daunting. Recent corporate strategic developments that have strong dependencies on knowledge sharing offered an opportunity for the KM team to propose several initiatives that align with the new strategy and, therefore, could garner support from top management.

As the costs of producing games within a crowded and competitive market are only increasing, the traditionally “isolated” game development model at Ubisoft is being re-examined in favor of one that more consciously encourages adherence to technical standards and reuse of existing products, tools, services, codes, and assets to both save costs and ensure that more of the teams’ time can be allocated to innovation. To achieve this, Ubisoft focuses on two new strategies: motherships and satellites as a model for quickly prototyping and launching games and technological convergence to enable the reuse of standard tools and services. Both initiatives repose on knowledge sharing. In the case of motherships and satellites, the goal is to create spin-offs, or satellites, of successful games or motherships, in large part via reuse of core components from the mothership combined with the creation of new gameplay, features, narration, or other game elements. Similarly, technological convergence requires teams to reuse existing pipelines, development products, or standard operating services, and thus, knowledge capture, sharing, and reuse must be in place to allow project teams to integrate and build off an existing internal tech stack easily.

In this context, the KM team recognized an opening to implement and promote several knowledge sharing initiatives which, while addressing many of the barriers outlined, have the advantage of also supporting the two Ubisoft strategies mentioned. By concretely linking KM objectives to organizational ones, the KM team hopes to convert top management into sponsors and champions of the initiatives. Working within the historically flat or decentralized culture at Ubisoft that tends to valorize bottom-up initiatives over top-down decisions, the KM team wants to implement several pilot projects to prove the value of knowledge sharing. The hope is to use the positive results and impact to rally support from top management, which will be crucial when attempting to scale. For cultural changes to happen, support from top management is required, whether in the form of leading by example, promoting the vision, and even enforcing changes when needed.

The bottom-up model will be followed in parallel, with the expectation that when initiatives have shown their potential within one team, others will be encouraged to follow by implementing and adapting them to their own teams.

## **New Content Management Paradigm**

Content organization at Ubisoft is extremely project-centric: each game project has its own setup in terms of communication, documentation, collaboration, task, and asset management. When a new game project kicks off, standard blank documentation platforms such as Confluence or SharePoint are provided. These platforms include several elements of structure, such as an information architecture and content strategy, provided by the KM team. The documentation itself, however, is the responsibility of the team. It tends to either be created from scratch as the game is being developed or copied and pasted from previous projects. Project documentation is restricted to the project team only and first shared with other projects at the game's release or shortly before. For teams developing live games, which are continuously developed and maintained with new content released at regular intervals, a minimal amount of documentation (if any) is shared, given the fear of leaks or loss of a competitive advantage. The barriers of confidentiality and security policies plus inter-project competition create tangible blockers for better knowledge sharing.

These barriers lead to vast amounts of duplicated work. When documentation on basic components is too difficult to access from other projects, teams take it upon themselves to recreate it, effectively "reinventing the wheel" over and over again. When documentation is copied from other productions, it invariably creates multiple different versions, which leads to wasted effort in duplication and prevents teams from benefiting from the knowledge of other projects. These multiple versions additionally create issues of content ownership, and in most cases, content rapidly becomes out of date or obsolete due to a lack of governance.

The KM team's new content management paradigm initiative will challenge this project-focused strategy of managing content. Instead of organizing content around projects, the KM team proposes to organize it in topic or job-related knowledge hubs to operationalize the strategic priority of convergence and avoid issues of content duplication, limited or restricted access, and overall inaccessibility.

These knowledge hubs shared across Ubisoft intend to:

- Break down project-focused silos.
- Cultivate trust among teams and subject matter experts by allowing them to co-create shared visions.
- Transform internal tacit knowledge into explicit information, which can then become tacit knowledge for more employees within Ubisoft.
- Strengthen ability-based trust by making externalized knowledge more visible and accurate.

Of course, there will always be documentation that remains specific to one game and is therefore not relevant for inclusion within a knowledge hub. Some content will still be too confidential to share outside the project, and other types will be irrelevant for employees working on other games. To this end, the KM team proposes maintaining dedicated game project spaces that rally the project team around a shared core vision, enable production management, and are enriched with content from multiple knowledge hubs. In this way, individual projects can benefit from topical best practices documented in knowledge hubs without compromising the basic needs for a degree of confidentiality within the core project team.

Furthermore, these knowledge hubs will address the issue of sustainable content organization. Since they will be independent and not tied to the lifecycle of an individual game project, they will become the source of truth on which more projects can rely (not to mention the place where experts can add their

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contributions). Instead of starting from scratch or copying and pasting from previous project documentation, projects can quickly benefit from the already available and reliable knowledge within these hubs.

A potential obstacle for knowledge hubs will be the question of ownership. Clear and adapted governance policies should be enforced to ensure that content gets created, updated, and potentially archived to remain credible and trustworthy to end-users.

In the interest to operationalize this initiative, the KM team plans to create a small-scale beta version knowledge hub for integration with a game project and will evaluate its success in terms of usage statistics, as well as decreased rates of duplicated content. With this, the KM team can better sell the concept to more productions, as well as accompany subject matter experts in the creation, organization, and promotion of more knowledge hubs.

## **Job Communities**

The KM team can more concretely operationalize the new content management paradigm by relying on job communities within Ubisoft. Community development is already part of the KM team's focus because people are a critical component of any knowledge sharing strategy. KM supports the development of new or nascent communities, especially those focused on strategic topics for the company, as well as the growth or maturity efforts of existing communities.

By fostering and building internal job communities, KM aims to strengthen trust at Ubisoft, particularly for employees who may not have lots of experience at the company and the network that comes with time. By connecting employees with similar job profiles, who are often spread across multiple projects, teams, and locations, multiple enablers for successful knowledge sharing should follow. The predominantly vertical organization at Ubisoft, which fosters silos between productions, could be overcome by adding a more horizontal orientation where members of the same job family, such as audio designers working on different projects, participate and share knowledge within a dedicated community.

If job communities can centralize their essential knowledge in hubs accessible to and trusted by the teams and projects that require it, there are better chances of that content reaching a wider audience, with the added benefits of decreasing duplicated and multiple versions of the same information. This, in turn, can increase individual motivation to share knowledge: it is more motivating to share within a recognized forum for a specific knowledge domain versus sharing within a site that may not have the most relevant audience. Furthermore, by designing the knowledge hubs to include standard social media-type features, such as clearly visible information on the content creator, contributors, consumers, and interactive features such as likes and reshares, KM intends to build in a recognition mechanism that not only testifies the content's accuracy and credibility but also highlights those responsible for it – a virtuous cycle of knowledge sharing.

The envisioned job communities (and resulting knowledge hubs) will be cultivated via ability-based trust and the psychological tendency to trust people who are like oneself. Within the job communities, experts will exchange and share with their peers. This exchange, considering the nature of knowledge, can play a crucial role in the dynamic process between knowledge and explicit information creation. Pyrko et al. (2016) introduce the concept of “thinking together” as a necessity for communities of practice. Communities of practice, in this case, job communities, provide a place for employees to come together around relevant problems. The members of the community can share tacit knowledge by mutually guiding each other through their understandings. This can, in the end, lead to new knowledge and explicit information that then again can be internalized within the community.

By leveraging the notion of sharing as power, KM hopes to position individual employees within a job community as experts who can be considered go-to resources for job-related questions or advice. This will, in turn, strengthen integrity-based trust, as employees within a community develop bonds based on what they have shared with their peers, no matter the individual's location or team/project affiliation.

## **Redefine the Internal Security Policy**

A major obstacle for both strengthening job communities and implementing the knowledge hubs within the new content management paradigm is Ubisoft's current internal security policy. The policy's complexity with regards to disclosing knowledge at different levels and to different audiences constitutes a blocker to sharing relevant knowledge outside of one's immediate team.

Consequently, the security guidelines should be simplified and communicated more effectively. To do so, it would be helpful first to understand why they are overly complex. Do they, in fact, mitigate or prevent leaks and insider information? Or are they blocking desirable behaviors, such as knowledge sharing? KM will build a case for a more open security policy that better supports (or at least does not actively prevent) more knowledge sharing.

As stressed in the culture and work environment section, for any initiative to have an impact, it must be rooted in the culture. It will not be enough to simply change the security policies as a symbolic gesture at the top of the iceberg. The culture at Ubisoft also needs to support knowledge sharing rather than positioning it as a threat.

In terms of approach, KM plans to partner with like-minded stakeholders (as well as those responsible for the current security policy) to propose and test viable solutions at a smaller scale before attempting to widen the scope. At Ubisoft, there is currently a renewed focus on the importance of consolidating internal technologies to ensure better collaboration and development. One of the supporting pillars of this strategy is better sharing and reuse of internal documentation. KM needs to team up with these types of initiatives and bring its expertise to refine proposed strategies to enable more and better knowledge sharing in general.

## **Recognition for Knowledge Sharing**

Both strengthened job communities and the knowledge hubs under the new content management paradigm should increase individuals' motivation to share by virtue of better visibility and better opportunities. Because motivation is individual, these factors may be influential for some employees but not for others. To maximize the chances of success, additional types of rewards or recognition may be required. Here it is important to distinguish between rewards and recognition.

Rewards usually generate motivation at the start of a project before knowledge sharing becomes a work habit. On the other hand, the return on investment gets smaller and smaller as time passes. At that point, it can be a challenge to terminate the reward in place without upsetting the employees the system was meant to motivate (American Productivity & Quality Center [APQC], 2021). Additionally, providing rewards for knowledge sharing runs the risk that employees perceive the act of sharing knowledge as an extra effort that is only worthwhile if rewarded for it.

Rewards can be seen as symbols at the top of the organizational iceberg that will not impact the basic underlying assumptions. Recognition, on the other hand, has a better chance of generating a cultural change. A concrete way to use recognition as motivation is by making knowledge sharing part of

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job descriptions and evaluating knowledge sharing via objectives and key results (OKRs). Simply put, managers set annual objectives for their teams, each of which is achievable by completing a number of associated key results. By tying knowledge sharing explicitly to an employee's OKRs, employees could have more substantial incentives to participate in the pursuit of recognition by their peers and managers. Performance evaluations of OKRs impact both an employee's bonus and salary increase; as such, they are a potential area to leverage when trying to use control as a mechanism to motivate employees to share knowledge.

To more explicitly motivate employees to share knowledge, the KM team has partnered with teams looking to improve their documentation to propose a set of key results linked to objectives for use by managers. These key results will be customized by job functions and responsibilities. Some examples include: Develop a step by step guide on the usage of feature x in technology y; update the overall description of process x quarterly; present the latest developments at a team meeting 2-3 times a year.

If proven successful in terms of motivating knowledge sharing, the initiative can be rolled out on a larger scale. For the initiative to succeed, team leads need to understand the importance of knowledge sharing and how concrete key results can play a role in motivating their teams to share.

## **Training**

This is the most straightforward initiative in which the KM team can play an active role right away. While less revolutionary in terms of change and impact, training is still necessary to provide the right messages and allow decision-makers to fully understand the benefits of knowledge sharing, therefore preparing them to apply it in their teams via initiatives like knowledge sharing OKRs or job communities.

The training initiative has two focus points: awareness sessions for newcomers to Ubisoft and training tailored to leads and managers.

It is always a challenge to change behaviors in terms of established workflows and habits, especially in the case of employees who have been in the same organization or position for years. This is why newcomers are an attractive target for training. They are aware that they need to learn and will typically do what they can to adapt to their new workplace's culture. This provides an opportunity to onboard newcomers from day one to the importance of knowledge sharing and how it can benefit both the company and themselves. The proposed KM training will focus on the importance of knowledge sharing at a company level, knowledge sharing as reciprocity and in the employees' best interest, and concrete suggestions on how to share knowledge at Ubisoft.

This initiative, however, will only be effective if the newcomers' team and work environment actually support the content of the training. Upon arrival in a new team, newcomers must have their managers' encouragement to share and the example of their colleagues putting into practice knowledge sharing. If there is a culture where managers do not allow their teams the time to participate in knowledge sharing activities, the risk is that no concrete positive results will be observed. For this reason, providing adapted training to managers so they understand the value of knowledge sharing is essential. The KM team wants to develop short e-learning capsules that should be mandatory for team leads and managers. The capsules will cover concrete examples of both the benefits of knowledge sharing as well as suggestions on how to encourage and implement knowledge sharing activities. The development of this training material will go hand in hand with the recognition for the knowledge sharing initiative.

## **Measuring Change**

Changes do not happen overnight, especially when it comes to cultural changes in an organization with more than 20,000 employees. While no single initiative can transform the existing culture alone, the ambition is that in combination, the different initiatives proposed can generate trust and strengthen the knowledge sharing culture at Ubisoft. The fact that basic underlying assumptions are often hidden and thus challenging to identify makes cultural changes difficult to not only carry out but also to measure. Evidently, it will be hard to prove causality or to pinpoint precisely which initiative affected which change.

The KM team will work with three key performance indicators (KPIs), as explained by Fritz (2020), to measure the initiatives' effect: output, outcome, and impact.

The output of the initiative is the concrete result that can easily be measured or counted. For example, in the case of the training initiative, the output would be the number of sessions and participants during a given interval of time.

The output does not indicate whether the training sessions had a positive effect. Here the outcome KPI takes things a step further. The outcomes examine if any meaningful changes can be observed in skills, attitudes, behavior, conditions, or support for the employees who attended. This can be measured via interviews with employees post-training and by monitoring any increase in the number of knowledge sharing OKRs among participants.

A deeper look at the impact will be needed to obtain an indication of actual changes in the culture. Measuring impacts should reveal any changes in the knowledge sharing culture due to the initiatives. These impacts are the hardest to measure since they may or may not have happened. To attempt this, KM will conduct a company-wide survey to capture employee views and attitudes on knowledge sharing overall, the enablers, and the barriers. For example, specific questions about support from leads, allocated time to document, motivation to share, better access to knowledge, and less duplication of content will be included. This survey will be sent yearly to create a baseline and measure any progress as an indication of cultural changes.

## **FUTURE RESEARCH DIRECTIONS**

Part of measuring the impact of the initiatives will also be about evaluating them and the concepts on which they are constructed. This could lead to previous hidden or newly emerged barriers or enablers occurring. Barriers and enablers that could reshape the initiatives or lead to the construction of entirely new ones. This underscores the fact that implementing a knowledge sharing culture is iterative. Cultures and organizations are always in development. It is therefore important to revisit and evaluate enablers, barriers, and initiatives from time to time.

Like all models, the knowledge sharing culture circle, with its enablers and barriers, is a construction. By choosing to operationalize these concepts, the Ubisoft KM team focused on specific barriers, potentially to the exclusion of others that would reflect a different view of the state of knowledge sharing at Ubisoft. These blind spots originate from the fact that the KM team is part of the existing Ubisoft culture that it is attempting to modify. Whether internal or external to Ubisoft, other teams or practitioners would construct different enablers and barriers that would shape a different perspective on knowledge sharing and lead to other types of initiatives.



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But hopefully, this chapter can inspire reflection and foster ideas on how to turn abstract concepts such as knowledge sharing and trust into more concrete initiatives for those responsible for KM programs.

### **CONCLUSION**

While many different enablers for knowledge sharing exist and can be articulated in multiple ways, the most dominant enablers for a strong knowledge sharing culture within Ubisoft are defined as:

- Trust.
- The nature of knowledge.
- Opportunities to share.
- Motivation to share.
- Culture and work environment.

As visualized in the knowledge sharing culture circle, trust plays a vital role for knowledge sharing to take place, in addition to being crucial for any of the other enablers to come into effect. The circle also demonstrates the interconnectivity of the enablers, reinforcing the need to develop multiple initiatives in tandem.

Four dominant barriers to knowledge sharing at Ubisoft have been identified as being security policies, competition, knowledge hoarding, and lack of prioritization. Like the enablers, the barriers are related and affect each other. For that reason, focus must be on all barriers and enablers together when developing initiatives.

Cultural changes are needed to overcome the barriers, so collaboration, trust, and sharing become the norm. To activate these changes, five initiatives are proposed:

- New content management paradigm
- Job communities
- Redefine the internal security policy
- Recognition for knowledge sharing
- Training

Some of the initiatives are more straightforward than others and will be easier for the KM team to carry out. As an example, it will be quite simple to set up training sessions for newcomers at Ubisoft. On the other hand, the new content management paradigm is much more complex but will also have a more profound impact on the work and routines of all employees. For this initiative to succeed, the internal security and confidentiality policies must be adopted and enforced. For this, a higher degree of trust is needed, which the job communities can help foster.

None of the described enablers, barriers, and initiatives in this chapter should be viewed as absolute solutions to cultivating a culture of knowledge sharing. However, the KM team believes that for Ubisoft, the initiatives can make knowledge sharing more valued and visible and consequently help transform the organizational culture into one that concretely supports this critical activity.

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## KEY TERMS AND DEFINITIONS

**Knowledge Sharing:** A mutual formal or informal exchange of ideas among individuals or groups.

**Knowledge Sharing Barriers:** Anything that hinders or impedes efficient knowledge sharing. At Ubisoft the barriers identified are security, knowledge hoarding, competition, and lack of prioritization.

**Knowledge Sharing Culture Circle:** A model illustrating five enablers that are perceived as necessary for knowledge sharing to happen in an organization.

**Knowledge Sharing Enablers:** Factors that can facilitate or contribute to effective knowledge sharing in an organization. The five enablers are: the nature of knowledge, opportunities to share, motivation to share, the culture and work environment, and trust.

**Knowledge Sharing Initiatives:** Concrete actions based on the enablers of knowledge sharing that are intended to help overcome knowledge sharing barriers.

**New Content Management Paradigm:** Ubisoft's vision to organize internal knowledge in ways that are better supported by the knowledge sharing enablers and will break down internal silos.

**Trust:** A prerequisite for knowledge sharing to take place. Trust can be categorized as one of two types, integrity and ability based, and is about the willingness to be vulnerable to the actions of another party based on the expectations that they will deliver something important or of value.

Section 3

# Tools and Technology

# Chapter 14

## A Closer Look at Concept Map Collaborative Creation in Product Lifecycle Management

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### **ABSTRACT**

*One of the greatest challenges of effectively managing knowledge in an organization is promoting seamless connections of operations between departments. Historically, information systems supporting operations have been developed with a specific department's culture in background. Therefore, connecting data, information systems, and people across the product lifecycle is an ongoing puzzle for organizations. Theorists and practitioners agree on the need to include employees' expertise and vision in this process. This chapter explores a tacit knowledge capture tool and a methodology to use it as a means to voice the interaction and negotiation among employees to support KM and IT strategy and development choices. Concept maps collaborative creation can provide a usability tool focused on meaning throughout the product lifecycle. A literature review of the challenges involved and of the proposed tool is presented, followed by a use case and the methodology for the concept map collaborative creation session, concluded with recommendations drawn from theory and practice.*

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## **INTRODUCTION**

Product Lifecycle Management (PLM) aims to connect all the steps of creation, development and commercialization of a product. Businesses expect that the adoption of product lifecycle management translates into an increase in connectivity among the different departments involved, less faulty items and more rapid implementation of procedural changes, among other benefits. The implementation of the product lifecycle management paradigm requires the identification of the contact points among the existing departments, the impact of the deliverables generated by a team on the work of other teams and the knowledge of the data and information systems serving and being used by each department. As classification is a natural human reflex to understand the world, classifications focusing on each one of the developmental steps may already exist within the organization. These classifications might, however, reflect the thought paradigm that is particular to the department for which it was developed. Including existing classifications in the PLM effort would therefore have the benefit of creating a common perception of the whole product lifecycle, or at least of the common points among teams.

Before the implementation of a PLM initiative in an organization, the connections among departments, if they exist, happen in an informal way that is not supported by information systems. They are often poorly documented in policies or procedures. Informal collaboration implies the use of tacit knowledge such as knowledge about the common points and areas among departments, the organizational culture, and also refers to having personal contacts in other teams and having problem resolution capacity, among other elements. In that sense, a certain connectivity among departments or, at least, a certain knowledge of what is missing to create that connectivity already exists before the implementation of the product lifecycle management paradigm, even though this may not be documented. This connectivity, as well as the knowledge of the challenges in creating a more structured environment for this connectivity, is lost when the employees that hold them quit the organization. The preservation and use of this tacit knowledge has the potential to ensure the PLM transition is adapted to the reality of the organization.

Converting all this tacit knowledge into explicit knowledge is expensive and sometimes not even possible. Explicit knowledge requires the use of language and logic, which invariably leads to a reduction in the multifaceted nature of tacit knowledge. Modeling the interaction between tacit and explicit knowledge will however require some level codification of tacit knowledge. The challenge is to represent tacit knowledge in a fashion that is clear enough to lend itself to modeling without actually converting all of this tacit knowledge into explicit knowledge.

The term “tacit knowledge” refers to knowledge that has not been expressed in any kind of language (Nonaka & Takeuchi, 1995). “Explicit knowledge” addresses the knowledge that has been articulated to the extent that it can be understood without needing direct access to the holder of that knowledge. Consider a continuum of media that hold knowledge. Human minds would be on one extreme whereas documents would be on the other. The knowledge that resides in human minds is named tacit knowledge. To be codified, knowledge has to be exteriorized (made explicit) to some level, one that makes it possible to use natural language. The knowledge that was exteriorized to the level needed for codification allows for a more or less complete understanding of the topic without the need to talk to the original holder of the tacit knowledge. This study explores a medium that is between human minds and documents, a medium that requires a less difficult exteriorization process. This medium offers a range of possible meanings but depends on the original holder of the tacit knowledge to be fully understood. The somewhat exteriorized knowledge cannot be said to be explicit, as it is not independent from the tacit knowledge at its origins. It is therefore named “captured” tacit knowledge, to convey the meaning of an incomplete

exteriorization process. Captured tacit knowledge differs from explicit knowledge in the sense that it keeps most of the multifaceted nature of tacit knowledge, requiring reconstitution of context in order to be accurately conveyed and understood.

While few tools or techniques to capture tacit knowledge can be found in the product lifecycle management literature, a number of techniques can be found in the more general knowledge management (KM) literature. To fill this gap, this study was inspired by practices exploring the collaborative creation of concept maps. This introduction offered an overview of the issue. An exploration of the relationship between KM and PLM and the study of the potential of concept maps for the capture of tacit knowledge follows. The next section presents an exercise in tacit knowledge capture and the analysis of this type of capture within PLM. An introduction to a practical approach to the collaborative creation of concept maps is also described in chronological order of implementation: participant selection; introductory activities; concept map construction activities and their subsequent transformation into an ontology. The section concludes with recommendations drawn from theory and practice. The secondary effects of collaborative concept map creation and the limits of the methodology are then explored. A brief conclusion closes this study.

## **BACKGROUND**

Product Lifecycle Management requires the integration of different functions pertaining to the design, development, commercialization and support of a product. These functions have been traditionally carried out by different departments in the organization (Kale, 2016), each one specialized in their function. As a consequence, the integration of these functions demands the management of different thoughts and expressions or, paradigms (Oliveira et al., 2018b). Thought paradigms are part of the tacit knowledge concept, namely, knowledge restricted to people's minds and that has not been documented. More often than not, this kind of knowledge is difficult to articulate. However, the articulation challenge depends on the person that holds that knowledge: what is difficult to articulate for someone might not be for another (Dalkir, 2017). Tools and techniques to capture tacit knowledge help managers navigate the organizational tension among processes, or the way things are formally organized, and the practice, the way things are really done (Brown & Duguid, 2000). The inclusion of tacit knowledge in process improvement projects has a positive impact in those projects (Anand et al., 2010).

The knowledge of the best information and data sources, of the needed steps or of who are the key players for the operationalization of a task represent examples of tacit knowledge that can have great impact in the acceptance of product lifecycle management systems (Oliveira et al., 2019). However, the challenge of tacit knowledge management in product lifecycle management was initially identified as an organizational problem (Batenburg et al., 2006), before being recognized as a gap in product lifecycle management (Kärkkäinen et al., 2012), and thus a gap that has to be addressed right away in its first steps (Oliveira et al., 2019).



## **CAPTURING TACIT KNOWLEDGE IN PRODUCT LIFECYCLE MANAGEMENT**

### **Concept Maps and Tacit Knowledge Capture**

Tacit knowledge encompasses an individual's perspective of the world, their skills, their experience, their ability to engage with other individual's projects and the ways in which they go about accomplishing their tasks. This knowledge may be common to a group of individuals, such as professionals in the same domain, people of the same age group or the same culture. People holding a specific piece of tacit knowledge may not be aware that they hold this knowledge, which adds to the challenges of identifying this kind of knowledge. In addition, as noted earlier, this kind of knowledge may be very difficult to articulate.

### **Ontologies**

Ontologies present concepts and their relationships in the way they are perceived by an individual or by a group of people (Gruber, 1993), as well as in a machine-readable format. Ontologies have gained in popularity to help implement connections and interdependencies between departments in product lifecycle management (Smirnov & Shilov, 2018). They are considered essential tools to integrate management systems (Lanzenberger et al., 2008; Pellini & Jones, 2011; Pincher, 2010) and, consequently, in product lifecycle management (Kadiri & Kiritsis, 2015). Ontologies have the potential to foster the management of data pockets that, even though they are identified as similar, may be perceived in different ways by different departments, and therefore treated in different ways. This is referred to as "semantic heterogeneity," a condition resulting from the gathering of different data sources that are anchored in different contexts (Kadiri & Kiritsis, 2015; Kermanshahani, 2009; Sheth, 1999; Sheth & Kashyap, 1993).

Ontologies are often seen as the product of the analysis of the inherent logic behind the management and use of data, supported by organizational documents such as policies and procedures as in, for example, Joseph and Lourdasamy (2018) or Lim et al. (2011). In other words, ontologies are developed based on the ontology experts' understanding of knowledge codified in documents, the so-called explicit knowledge, which means that PLM systems are often solely based on explicit knowledge. However, as stated by Arduin et al. (2018), knowledge cannot be reduced to what has been codified. Employees make use of both explicit and tacit knowledge to navigate their informational environment and develop solutions for the everyday challenges that their jobs pose. When the analysis of the inherent logic behind the management and use of data completely relies on documents, an important source is left out of the process.

Documents convey codified knowledge, knowledge that went through the exteriorization process, which is a lengthy and costly process. Knowledge regarding data management and use might never have gone through that process, while still being vividly present in employees' minds. Ignoring that knowledge creates the risk of not adequately representing data, information and document sources, work flows or the interactions among different departments or key actors in a project. For instance, data meaning might be inferred by field labels, what would motivate the grouping of different data erroneously; information and document sources such as ad-hoc controls and accessible legacy information systems might be ignored, motivating future users to create workaround solutions for their information needs; work flows and interactions among different departments might be ignored or implemented in a linear fashion while interactions actually happen in several points of the work flow, motivating users to reduce the use of the support system. This inadequate representation of the organizational reality further creates

the risk of generating systems that can have negative influences such as reduced access to important information sources. Such negative influences might not be detected before the end of the design phase or even just after the system's implementation. The disconnect with the organizational reality may lead to user resistance and frustration (Wognum & Kerssens-van Drongelen, 2000; Wognum & Kerssens-Van Drongelen, 2005).

## Concept Maps

The first step in developing an ontology lies in its graphical portion (Brilhante et al., 2006; Castro et al., 2006; Starr & Oliveira, 2013; Yao & Gu, 2013). This portion represents the concepts based in the practice that will be supported by the system. The graphical portion of ontologies is often referred to as conceptual maps (Sowa, 1992). Conceptual maps are often the first step for classification products, such as ontologies, controlled vocabularies and taxonomies. The last two are not always machine-readable. A controlled vocabulary is a tool to support keyword attribution, or indexing, and the search of documents. A taxonomy may be used as a document classification system. Both tools can help manage documents, projects and products, among other uses.

Integrating tacit knowledge into any initiative requires tools to support the identification and articulation of this knowledge. Concept maps are one type of tool that can help. They have been used in the expression of tacit knowledge possibly because they are situated somewhere between drawings and language, as explained by Umoquit et al. (2013), who made use of the studies produced by Banks (2001). In the educational environment, concept maps have helped students at different levels and in different disciplines to understand the connections among multiple aspects of a specific domain (Buldu & Buldu, 2010; Dansereau, 2005; González-García et al., 2012; Lambiotte et al., 1989). Educational concept maps were used at the undergraduate level (Shavelson et al., 2005), in an online environment (Xu et al., 2012), and in fields such as information technology (Herman & Choi, 2017) and medicine (Vink et al., 2016). Concept maps have also helped researchers to understand research data (Umoquit et al., 2011).

In more practical settings, concept maps have been used to help physicians better express the reasons why they did not always follow directives in drug prescription (Steinman et al., 2010) or in their practice in general (Steinman et al., 2010; Stuit et al., 2011; Ting et al., 2011); to help teams involved with knowledge management systems development (Andreasik, 2007; Baracscai & Velencei, 2004); in software development (Jabar et al., 2010) and support (Mohamed, 2010); in multimedia development (Freyens & Martin, 2007); and in construction (Barrett & Sutrisna, 2009), to mention only some. Kothari et al. (2011) suggested that the graphical layout of concept maps was the element that inspired the expression of action and skills. In other words, concept maps help the expression of the connections between an individual's behavior (their actions) and their tacit knowledge (their skills).

## Capturing Tacit Knowledge with a Concept Map: An Exercise

### Aim of the Exercise

An exercise to explore the potential of concept maps was done in 2019 with an engineer, a subject matter expert from the staff of an organization charged with the construction and maintenance of road infrastructure. The participant had more than ten years of experience before joining the organization. At the time of the exercise, they had been in charge of the Opportunity Study team for a couple of years. The

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aim of the exercise was to identify the necessary concepts to foster the transition from project-based management to management focused on the product lifecycle, covering processes that, although not formally part of a project, have great impact on the definition of projects. The organization is considering PLM but its current focus is on project-based management. The exercise's scope was focused on the preliminary phases of the product creation.

### **Current Tools and Methodologies**

The implementation of project-based management happened in 2012 in this organization. It was joined and supported by the creation of a document classification system, implemented in 2016. The project-based classification system offers ways to group documents from product design until its construction. The organization also employs a classification plan that covers all organizational activities, which was updated in 2018. Document management is supported by a technological solution which implemented both classification systems. The project management methodology and its classification system followed four steps:

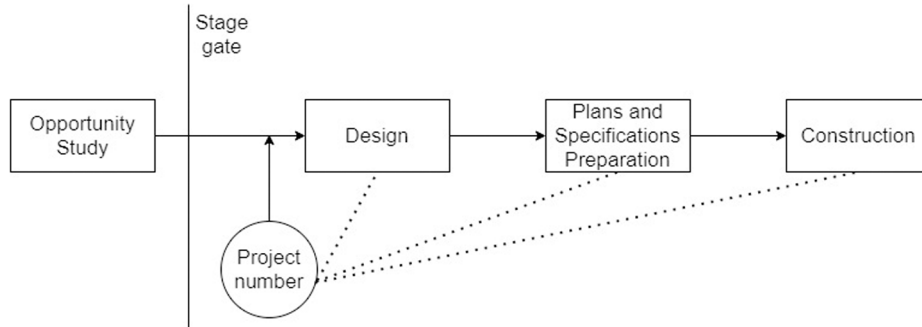
1. Opportunity Study;
2. Design;
3. Plans and Specifications Preparation and
4. Construction.

One classification system supports the steps from Design to Construction, while the overall classification plan covers all organizational activities, including those taking place before or during the Opportunity Study phase.

All projects have a project number assigned to them once they have successfully gone through a selection process, which happens at the end of the Opportunity Study phase. The project number is assigned to a project when it successfully proceeds to the Design phase. It continues to be used until the end of the Construction phase. The project number is widely used across the organization. It is an essential piece of data in a number of databases supporting information systems. Knowledge workers from different departments refer to projects by their project number both in activities that are directly related to project management and in activities that are loosely connected to project management, such as material procurement. Information systems supporting the project management process adopt the project number in the same way that knowledge workers refer to projects by their project number in activities closely or loosely related to project management. It is used as a main code of reference or, to use database management terminology, a primary key, in information systems closely related to project development, such as the one holding project deadlines, budget and names of professionals responsible for the project. In information systems that are loosely related to project development, such as the one holding information on supplier payments, the code is used as a liaison code or, in database management terms, an external key. Figure 1 represents new product project phases and project number use.

Once the product is launched, it is given a call number. The product call number expresses the product in large portions (the whole road) and in three other smaller portions, ending with an indication no greater than a meter. The product call number allows for the identification of the portion of a road that serves a specific neighborhood, a city or larger geographical areas.

*Figure 1. Project phases and project number use*

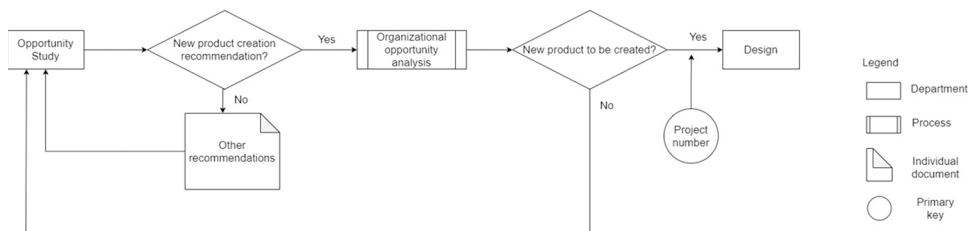


### Current Challenges

The participant’s team mission is to analyze issues stemming from the use of existing products and suggest solutions and new interventions. Different solutions may be proposed including the creation of new products. The ideation of new products is the responsibility of this team, whereas their design and construction is ensured by other teams. Figure 2 represents the team’s role regarding project creation. To idealize new products, the Opportunity Study team has to group needs expressed by product users and by partner organizations representing those users. There is also some expectation that new products recommendations meet organizational opportunities.

### Opportunity Study Role in Project Creation

*Figure 2. Opportunity study role in project creation*



Some of these partner organizations manage the territory where products are implemented. The communication with users and partner organizations is ensured by other teams. The document management supporting communications follows the classification plan of the organization. In their communication with the organization, partner organizations may refer to products by their commonly known name (“main street” instead of the actual street name, for example) or just generally express concerns. No controlled vocabulary or procedure supports the equivalence of terms. Most often, partner organizations refer to the geographical coverage that is common to both partner organizations and the studied organization. In

### A Closer Look at Concept Map Collaborative Creation in Product Lifecycle Management

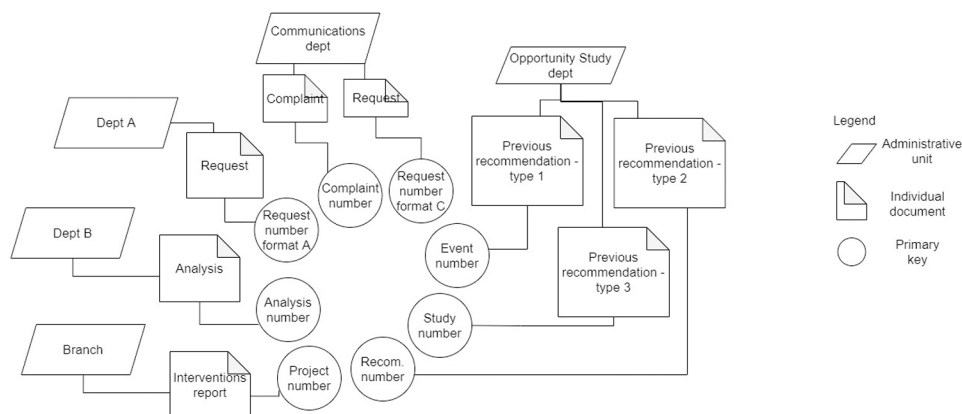
this case, partner organizations communication touches a portion of the organization's products. Eventually, some of these concerns may be generalized to all products managed by the organization. Partner organizations may refer to a very specific portion of a product or to a larger portion of that product.

Regarding outcomes from the departments responsible for communication with users and partner organizations, an essential archival principle, namely provenance (Couture, 1999), is implemented in the classification plan. In practice, documents produced by these teams are grouped in chronological order according to the department responsible for their creation. The provenance principle dictates that documents of the same creator should be grouped together. This principle aims to satisfy accountability requirements. Indeed, the implementation of this principle allows for the organization to quickly retrieve documents to assess responsibility when the organization is scrutinized by external authorities. A benefit of this principle is the enhancement of an organization's ability to answer legal requirements. However, the consideration of this single principle in document organization may impose a burden on workers in their daily tasks, as exemplified in this experience.

In addition to user needs, the participant's team has to group information on events that took place with respect to the existing products, which includes outcomes of investigations made by the same team in response to issues raised. Documents supporting these investigations also follow the organizational classification plan. The participant expressed difficulty in grouping the investigation's outcome of their own team using the classification plan. Indeed, the classification plan employs a chronological approach, serving the preservation of documents for legal purposes, which is an essential element of archival theory (Couture, 1999). In practice, however, documents supporting the analysis work performed by their team can be spread across five different entries, according to the type of event analyzed, the issues raised and the conclusion of the analysis. Documents are then organized by year within each entry. The browsing or searching effort to identify relevant documents is therefore similar to the one needed to identify relevant documents produced by other teams.

To facilitate document retrieval in the document management system, the creator department can insert a code in the document title. The code depends on the creator department's context: complaint number, request number and so on. Although this system possibly satisfies the creator departments' management needs, it is still far from practical for the participant's team, as each department implements

Figure 3. Documental environment of interest to opportunity studies in the creation of new products



a code that is meaningful to that department and, most often, to that department only. When a department is charged with many functions, as it is the case of the Opportunity Study, different codes may coexist.

The documental environment navigated by the participant's team in order to propose new products is represented in Figure 3.

To identify documents regarding a portion of a product, the participant's team has to browse through all the years of a specific department documents and, in each year, they have to then browse through documents created due to interactions with all partner organizations that manage the territory where that portion lies (and all other organizations represented in the classification plan that could possibly have an interest in the product portion). This, in addition to consulting each communication piece. There is no controlled vocabulary nor procedure connecting the partner organization to their geographical coverage.

The document system offers an alternative to browsing as a means to find documents: the search box. The search engine however, retrieves only documents that mention the exact terms mentioned in the search box. The search engine would miss relevant results when the product portion is referred to by its common name ("main street," in our example) or recall a great number of irrelevant results (in a search for a municipality, for example, complaints and requests would be among past projects, new projects, announcements and other documents that are not of interest for the participant's team).

The document research challenge that Opportunity Studies faces is simulated in Figure 4 and in Table 1. In these simulations, the new product explored is a reconfiguration of an existing product. This hypothetical existing product has the product number 123.452. The product is part of a larger product (123.450) which is in turn part of product 123.400, which is part of the largest product (with call number 123). This existing product is named Sweet Street but is also known as the main street of its city, St-Jean-de-la-Montagne.

The challenges in browsing and searching portrayed in Figure 4 are a small-scale representation of the actual challenges experienced by the participant in document research. This simulation portrays documents produced by only two other departments and during past projects of the branch. In practice, the number of departments involved may be up to ten. The representation covers only two years. In practice, at least five years must be analyzed. The number of relevant documents varies a lot from one potential product to another.

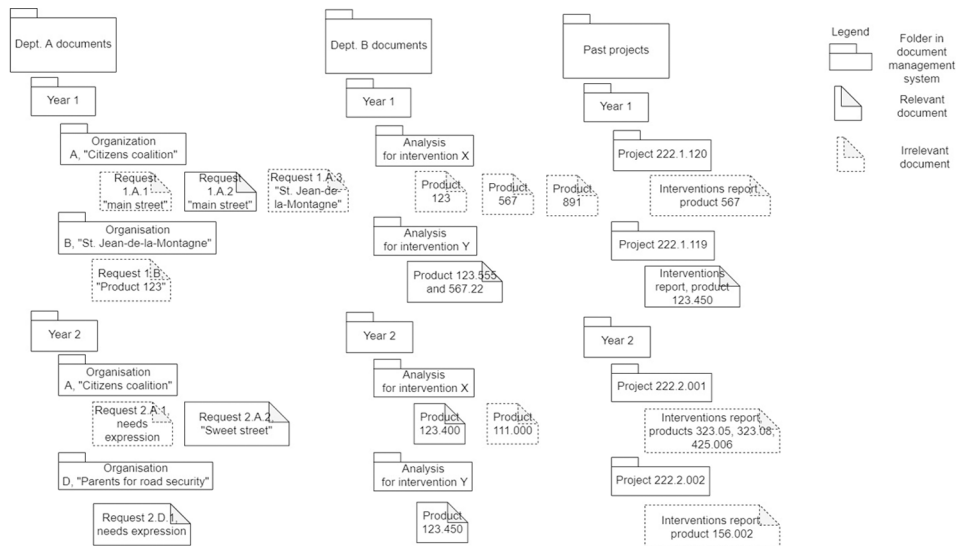
In this simulation, seven documents are relevant to the participant. These seven documents were created by two departments, in addition to the past projects completed by the branch. Table 1 exemplifies reasonable search attempts in the case the participant uses the document management system search engine. The analysis of the search query results presented in Table 1 refer to documents as represented in Figure 4. Brackets indicate how the products or organizations discussed in documents are named in these documents.

No single search query yielded all relevant results.

As mentioned, Figure 4 and Table 1 cover only some documents from two departments and past projects of the branch over two years. The actual document environment encompasses at least five departments, the participant's department and past projects of the branch. The level of frustration generated by document research might motivate employees to generate tacit knowledge in the form of informal networks of information. These contacts with members of other departments would help employees become aware of files used by other departments. A culture supporting collaboration and reciprocal relationships is essential for the development of this kind of tacit knowledge. When competitiveness is high and each department is only concerned with their own performance, social ties are seen as "not actual work" and a waste of time. In this environment, however, where, additionally, the document research poorly answers

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Figure 4. Document research through browsing challenge



practical needs, only professionals with strong social ties within the organization would be able to group all relevant documents. Grouping all relevant documents is a necessary condition for the Opportunity Studies department to be considered successful or even competent. As a consequence, only professionals that have spent a lot of time in the organization and that have been accepted in the informal networks of the organization are seen as competent in that position. The concurrence of these circumstances imposes a performance burden on professionals that might be reflected on job satisfaction, turnover rates, and possibly on the reputation of the organization.

### The Experience

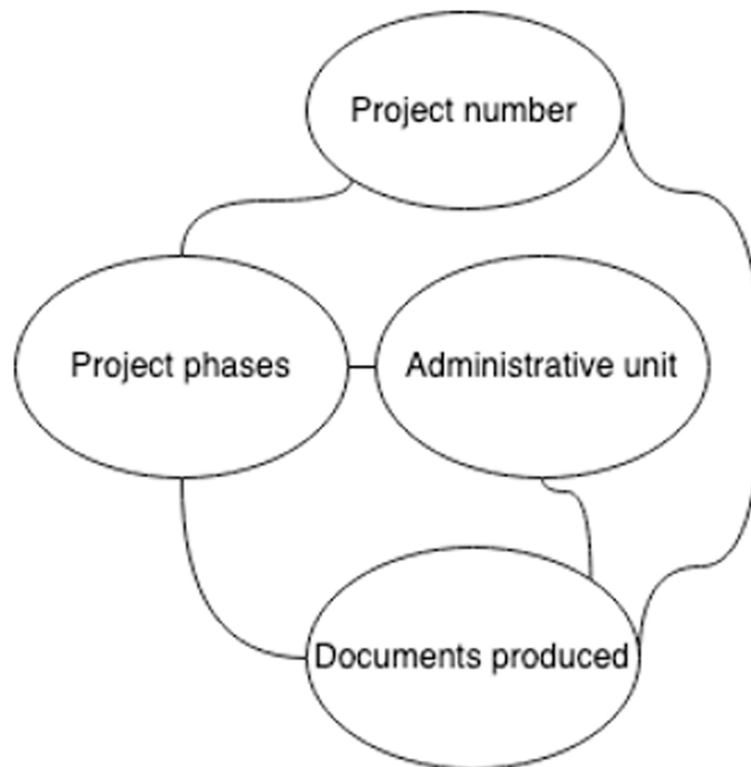
Concept maps were explained to the participant. Next, a concept map with concepts used in the current document management strategy for documents produced in the context of a project (Figure 5) was

Table 1. Information retrieval analysis of reasonable search queries in the document research simulation

Search query #	Search query expression	Number of results	Relevant results	Irrelevant results	Relevant non-results
1	123.452	0	0	0	7
2	123	6	4	2	3
3	sweet street and St.Jean-de-la-Montagne	0	0	0	7
4	main street and St.Jean-de-la-Montagne	0	0	0	7
5	St.Jean-de-la-Montagne	2	0	2	7
6	sweet street	1	1	0	6
7	main street	2	1	1	6

presented to the participant. The participant recognized the representation of all concepts used in the document management strategy considering documents produced during a project in this concept map. These concepts represented codes, steps in a process, document creators and outcomes. Each one of these elements was represented the same way, by a term inside an elliptical form. The connections between elements serve to illustrate a variety of different relationships.

*Figure 5. Concepts used in the current project management practice*



A critical thinking activity based on the grouping of documents produced by other teams followed. The participant was asked to describe the issues raised when trying to recall documents produced by other teams. After each statement, the participant was asked to identify the causes of difficulties mentioned in the previous statement. Through this critical thinking activity, the participant explained the existing problems and their possible causes in general terms. At the end, the participant was asked to summarize the problem and its causes. The key concepts mentioned in this summary were represented on a white board. In this activity, four additional concepts were added to the concept map: “user,” “partner,” “request,” and “complaint.”

A subsequent critical thinking activity explored the connection between the four new concepts and the existing ones. The participant was asked to explain the similarities between other departments’ work and theirs. After a few statements where the differences between departments were still mentioned, the participant identified a piece of information known to most departments of the organization. This piece



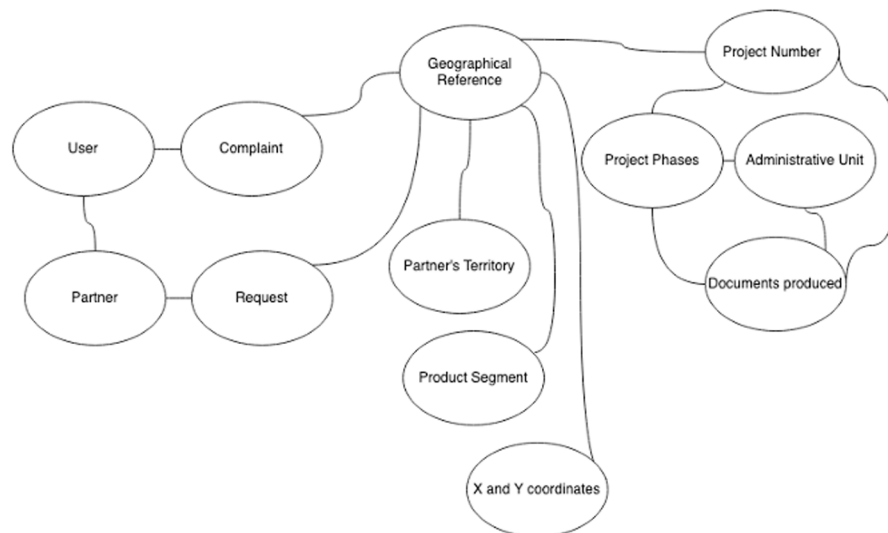
## ***A Closer Look at Concept Map Collaborative Creation in Product Lifecycle Management***

of information is a candidate for a common code among the departments involved and, in parallel, among the information systems involved. The participant also argued that an index using this information could be a solution to the grouping of documents that their team required.

During the critical thinking activities, the representation of a complex reality using minimalist elements provided a rich way of articulating the challenges surrounding the pre-project and the project phase and helped to explore possible elements of a solution. The concept map fostered a broad vision of the issues involved. In addition, when a piece of information serving both the pre-project documents and the project documents was identified, creating a link between the pre-project and project phases, the concept map also became a way of conveying the solution found.

This exercise illustrates how concept maps can help document specialized employees' perception of how things actually work in the organization and can be used in favor of departmental integration. If members of other departments also took part in the exercise, the concept "geographical reference" could be broken down until a common code or a common combination of codes was found, thus also fostering the integration of the information systems involved. More importantly, because a conceptual connection between different departments and different information systems was found, the concept map became useful to potential PLM efforts.

*Figure 6. Proposed connection link of documents and information in pre-project and project phases*



## **Tacit Knowledge Capture in the Product Lifecycle Management Context**

Product Lifecycle Management aims to maximize the efficacy of each phase and to better integrate different phases. PLM also aims to increase the reuse of outcomes and by-products generated in each phase. The product lifecycle management is an ideal to achieve. Product lifecycles may be designed with different underlying foci. For example, a product lifecycle design may privilege a theoretical logic, aligning phases and activities according to the availability of inputs and outputs for, and of, each step. Another product lifecycle design may privilege the collection, generation and treatment of management

information, supporting management overview and control of tasks. Implementing product lifecycle management implies changes in routines, roles and responsibilities, which will directly affect workers. When product lifecycles are designed with a focus on theoretical logic or management control without regard to workers' vision, the changes in routines, roles and responsibilities imposed on workers may seem illogical, counter-productive or excessively cumbersome to them. In that case, the product lifecycle is built according to a certain ideal and the task of adapting ongoing practices is left to employees. The alternative is to collect workers' vision and adapt the ideal product lifecycle to that vision. This alternative would be closer to the organization's reality as it would take into account the ongoing practices and make it easier for employees to adopt changes.

Ongoing practices may be poorly or simply not documented. In that case, they are a part of employees' tacit knowledge. Concept maps would then be useful tools to identify ongoing practices. Since product lifecycle management is a team effort, the interaction between employees is the best information source on these ongoing practices (Oliveira et al., 2019). The only technique to explore the interactions among participants is the focus group (Morgan, 1996), which is characterized by three elements:

1. The goal is to collect data
2. The interaction among participants is the data source and
3. The technique relies on the active role of a facilitator to motivate the group discussion to produce data (Morgan, 1996).

The facilitator's mission is to instigate and guide the discussion without ever intervening too much, creating the space for participants to build their own "‘hierarchy of importance,’ *their* language and concepts, *their* frameworks for understanding the world" (Kitzinger, 1994, p. 108) and represent their expertise domain (Lintern et al., 2018). Finding the balance between the degree of intervention and the periods of independent interaction requires a lot of training and preparation on the part of the facilitator. Doses of tact and diplomacy are also critical to the success of focus groups. When facilitation goes well, the group discussion leads participants to express the reasoning behind their way of thinking (Kitzinger, 1994). A well-facilitated group discussion also helps participants enumerate essential information they develop or use, which can be invaluable in identifying the data sources actually used in each product lifecycle phase.

The collaborative creation of concept maps in a group discussion session, previously named "participatory diagramming" (Kesby, 2000) or "diagrammatic elicitation" (Umoquit et al., 2013), allows the identification of common knowledge zones (Hughes & DuMont, 2002) as well as unique ones, in addition to the identification of the context surrounding the use of a term in a specific department. The result is a concept map that represents the product lifecycle as it is seen by those who would be the most affected by the implementation of the Product Lifecycle Management: the specialized staff of the organization. For this reason, the collaborative creation of concept maps is best carried out with the specialized staff of the organization as this has the potential to clarify the knowledge representation. The knowledge representation can then facilitate the integration of multiple data and information sources, of workflows from the beginning to the end of life of a product and of the tacit knowledge involved. Concept maps have a potential that has yet to be explored in the development of ontologies designed to be implemented in product lifecycle management.

## **SOLUTIONS AND RECOMMENDATIONS**

Umoquit et al. (2013) identified two strategies for applying the principle of collaborative concept map creation or “diagrammatic elicitation.” In the first, the session is conducted by the participants whereas in the second, it is conducted by the facilitator. In the first strategy, the participants generate the concept map from the beginning. In the second, a basic or simple concept map is presented to participants who then edit or expand upon it. The second strategy was our choice in the conducted exercise. The chosen strategy will impact the preparation needed before the collaborative session. The first strategy may allow for more exploration than the second. Both strategies may be useful in the design of the ontology that will support the implementation of lifecycle management. In fact, the need to understand the interaction among different information, data, documents and knowledge sources in a PLM implementation may evolve as the implementation advances (Oliveira et al., 2019), which will also impact the preparation for the collaborative session. As a consequence, the result of a given collaborative creation session will be different from another one that takes place at another stage during the project (Oliveira et al., 2018b) even if the same application strategy is employed.

### **The Collaborative Concept Map Creation Session**

In addition to the facilitator’s training and attitude, collaborative concept map creation sessions require a lot of preparation. The session has to be designed to allow participants to express themselves as freely as possible. To obtain this result, it is important to observe certain parameters, such as the selection of participants, the introductory activities, the concept map-building activities and the points of exploration to instigate through facilitation, among others.

#### **Participant Selection**

A concept map that aims to inform a system to support product lifecycle management must be created with the participation of the potential users of this system. The creation of a concept map in a group session demands participants that are inclined to express their needs and negotiate a consensus. A plurality of viewpoints is sought. If the aim of the concept map is to represent the connection between departments, all the departments should ideally be present in the same session.

Considering that this collaborative creation takes place with the specialized staff of the organization, it is reasonable to admit that said participants have a relationship that precedes the creation session. The qualities of these relationships will likely influence the capacity of expression of a given participant during the session. For example, it is possible that a participant will be reluctant to contradict their superior (Kitzinger, 1995) or their team members, if participants are distributed according to their departments. The selection of participants should therefore try to avoid hierarchical relationships and any feelings of rivalry. If needed, additional sessions may be scheduled.

#### **Introductory Activities**

The activities that precede the creation of the concept map must be designed to promote a relaxed atmosphere, one that inspires participants to trust one another (Kitzinger, 1995). The introductory activities also help the facilitator to better understand participants and their interaction. A relaxed atmosphere may

be attained by using a game unrelated to the core subject of the session. For example, an ice-breaker activity (Miller, 2008) may help participants momentarily disconnect from the work environment where the session might be carried on, know a little more about the other participants (Miller, 2015) and therefore have more productive collaboration with them.

A trust-based atmosphere should also be encouraged. A trust-based atmosphere helps the exploration of ideas that have not yet been explored (Oliveira & Dalkir, 2013), which can be crucial if the departments represented by the participants work mostly in silos. The introductory activities to inspire trust should help participants develop complicity or a context where a common interpretation of situations is possible. If it is true that even explicit knowledge can be articulated without ever mentioning the essential concepts of a field (Nahapiet, 2009; Oliveira et al., 2018a), the same phenomenon may take place with tacit knowledge. Complicity among participants helps to unite them towards a common goal and, as a consequence, helps achieve consensus in the group. Steinman et al. (2010) mention a discussion where physicians argued about patients' conditions, whereas it was implicit that they were actually talking about their own apprehension towards their colleagues. Kitzinger's (1994) suggestion may be useful to create the conditions for complicity among participants to manifest itself. In an introductory activity, statements related to the core subject are printed in cards. Participants are then asked to separate statements in two groups: the ones participants agree with and the one participants disagree with. This activity might generate discussions among participants on the core subject and help bring what participants have in common to the surface. Such introductory activities help ensure participants have the attention and attitude needed for the discussions surrounding the creation of the concept map.

## **The Map-Building Activities**

Concept maps may be built from topics that are suggested by the facilitator. If organizational information and data sources, documents or workflows have been previously explored by a researcher, the topics for consideration may be chosen among the questions the researcher had during the exploration of those elements (Novak, 1998). Another way to start off the discussion around the subject is the enumeration, by the participants, of topics that are important for them and that stem from the subject (Umoquit et al., 2013). It is important to help participants to analyze different aspects of the subject in question. Kitamura et al. (2007) suggested a list of perspectives to be explored in order to create an ontology, which can also be a good starting point. This list brings out hypotheses of interaction among data that are being considered for inclusion in an ontology. The intellectual facets presented by Oliveira et al. (2016) may be useful if the concept map should focus on the informal connections among departments, on the actual importance of existing documents and systems, on the different stakeholders, or on the needed personal skills to create connections among departments. Once some elements are present in the map, having participants identify causal links between events might help consolidate the group's understanding of contact points, inputs and outputs in each product lifecycle phase.

One of the greatest advantages of concept maps is the possibility of depicting a complex reality in a relatively simple way. To make this possible, the map must present each actor, dataset, indicator, input or output mentioned in the discussion. Each one of the concepts should be codified on a *post-it* note (Umoquit et al., 2013) or on a drawing that represents the concept. If semantic heterogeneity is suspected, the facilitator must ensure that the different meanings, uses and implications of each concept are discussed and that a consensus on the meaning, labelling and connections among concepts is achieved. Often, after discussion, the concept's initial idea is decomposed and generates other concepts that can

## ***A Closer Look at Concept Map Collaborative Creation in Product Lifecycle Management***

be more specific and less ambiguous than the original idea of the concept. These discussions will help the researcher to understand the causes, contexts, priorities and possible solutions to the challenges surrounding the semantic heterogeneity in that specific product lifecycle.

The depiction of the concept on the map and the place that the concept should occupy on the map must be validated with the group. It is the facilitator's responsibility to guide the group towards a consensus over the concept denomination, its connections and its place on the map. If needed, a small portion of the map can be reserved to host the concepts that are still being evaluated.

The connections among concepts are also an important element in the construction of the map. For this reason, participants must be able to visualize all concepts already represented on the map and their relationships as the development of the map evolves. It is therefore important that the map medium be large enough to host the representation of the subject in its entirety. It is probable that participants will change their minds many times regarding the denomination of a concept or its relationships. The map's medium must be flexible enough to allow for quick changes.

It is also to be noted that the discussion may become heated and evolve very quickly. In order to keep the discussion around the session's goals, the facilitator has to focus on keeping visual contact, intervening frequently and codifying quickly, which is already a lot during a fast-paced discussion. As a consequence, notes on the session should be taken by someone other than the facilitator. These notes will help the researcher to better understand the context explored in the session.

### **Concept Map Absorption in the Ontology**

The concept map developed with this methodology carries a portion of the user's vision over the product lifecycle that is amenable to automation. The concepts and the relationships on the concept map must be present in the ontology developed to support the product lifecycle management system.

The concept map developed with this methodology presents what is the most important in the product lifecycle according to key actors in this lifecycle. It may then inform the product lifecycle automation strategy considered by the organization. On the other hand, while discussing what should be present in the concept map and what should not, participants will mention points that have only local or low impact. These points represent elements that, if included in an ontology, risk having less impact on practice. As a consequence, these points should not be given priority in the organization's automation strategy. Finally, the concept may have been built in an analog medium, which implies the entry of concepts and their relationships in the ontology's medium.

### **Benefits of the Collaborative Creation of Concept Maps**

Core benefits of concept maps include representing reality as it is, as a consequence of negotiation and consensus-building. Concept maps produced in groups allow for the groups themselves to weigh their conflicting interests, whereas this is a very difficult exercise for the researcher on their own. Concept maps are versatile and they can serve as the starting point for ontologies, for controlled vocabularies or taxonomies, to mention only some uses.

The collaborative creation of concept maps has the potential to reduce the number of hours employed in document analysis by the researchers to create the ontology to support the PLM system.

In addition, collaborative creation of concept maps requires the involvement of specialized staff of the organization. This is the staff that can generate the greatest resistance to product lifecycle management

(Wognum & Kerssens-Van Drongelen, 2005). Integrating these participants in the conceptual creation of the product lifecycle management framework may reduce the resistance to it as the framework itself will be better adapted to their needs and perspectives.

The collaborative creation of concept maps may also promote an increase in participant's awareness of the impact of their work over other teams, especially where departments evolve in great isolation from others.

## **FUTURE RESEARCH DIRECTIONS**

Two main directions for future research have been identified. The first is the exploration of the limits of the generalization potential of a collaboratively created concept map. As the preparation and facilitation of creation sessions have a great impact over their result, it is possible that the data collected in the session has limited generalization potential and cannot be used beyond the uses that motivated the specific session.

The second is how researchers may understand and analyze collaboratively created concept maps. It is important to note that sessions designed to validate the resulting ontology may be considered.

## **CONCLUSION**

This study highlights the importance of tacit knowledge for the identification of connections and interdependencies among teams. This tacit knowledge is held by knowledge workers in most organizations, especially in long-lived ones. However, organizations might overlook this tacit knowledge and replace it by external knowledge, usually offered by consultants, when PLM is portrayed solely as a benefit of adopting a technological solution. If the external knowledge relies only on the explicit knowledge of the organization, some undesired consequences might occur, such as the need for greater collaboration from the workforce to adapt to the technological solution, resistance, and low adoption of the technological solution. In other words, the organization might pay for an expensive solution based on knowledge that does not fully address its needs while the knowledge that does address its needs already exists in-house. Also, knowledge workers that do understand how to better implement PLM might be forced to adapt to a PLM implementation that is ineffective, counter-productive, or just seems to have too much of a high cost for the benefit that it brings.

The study also explored how specialized staffs' tacit knowledge may help the data analysis work that is necessary for the resolution of semantic heterogeneity. The potential of concept maps as a tacit knowledge capture tool was explored. The social aspect of the necessary work to implement a product lifecycle management system was recognized and the interaction among employees, which reflects the existing work organization, was emphasized as an information source. The consideration of these research objectives led to the recognition of the potential of the collaborative creation of concept maps in product lifecycle management. Recommendations for the concept map collaborative creation session preparation and for the application of concept maps in ontologies were provided, and limitations of the concept map collaborative creation sessions were discussed. Future studies should expand on the exploration of facilitation techniques for collaborative creation of concept maps and the use of collaboratively created concept maps as starting points for the creation or expansion of ontologies.

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## KEY TERMS AND DEFINITIONS

**Codified Knowledge:** Knowledge that has been expressed in natural language.

**Concept Maps:** A visual tool that represents concepts and relationships among them. Relationships are represented with a single line to reduce the cognitive load related to the interpretation of the message.

**Explicit Knowledge:** Knowledge that has been articulated and expressed through some kind of language. All codified knowledge is explicit.

**Focus Groups:** An interviewing technique that concentrates on the interaction among participants and not only on the input of each participant individually.

**Knowledge Conversion:** With respect to Nonaka and Takeuchi's (1995) SECI model, the transformation of one kind of knowledge into another. Two kinds of knowledge are considered: tacit and explicit.

**Knowledge Exteriorization:** With respect to Nonaka and Takeuchi's (1995) SECI model, it is the process through which tacit knowledge becomes explicit knowledge.

**Ontologies:** A machine-readable tool that relates concepts, often conforming to formalistic rules.

**Product Lifecycle Management:** A management paradigm that concentrates on the suitability of inputs and outputs of a department in regard to the lifecycle of a product, on the re-use of sub-products and on the maximization of resources. It is also a paradigm that fosters organizational adaptability and quick change in production.

**Tacit Knowledge:** Knowledge that resides in people's minds and that might not ever have been articulated through some kind of language.

**Tacit Knowledge Capture:** A technique that allows the expression of tacit knowledge with significantly lower reduction of its multifaceted nature if compared to expression in natural language.

# Chapter 15

## Information Culture and Effective Use of Information Tools at Work: Conceptualizing and Measuring Group Adoption

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### **ABSTRACT**

*Office work is increasingly collaborative in the 21st century. 'Information culture' is a broad set of values and behavioural workplace norms pertaining to information management and use. To investigate whether information culture influences use of collaborative information tools, conceptualization and measurement instruments are presented for information culture and measuring effective use. 'Group adoption' is a behavioural proxy for effective use, and 'information sharing' and 'proactive information use' were selected as behavioural proxies for information culture. In a study of an engineering firm, group adoption was correlated with actual use of an information tool and with two tool attitude measures. Group adoption was also correlated with both information culture measures. The findings here suggest new avenues of research into the broader applicability of group adoption, and the ways in which conceptualization and measurement of information culture may be further developed.*

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## INTRODUCTION

### Overview

This chapter explores two complex and inter-related constructs. The first is *information culture*, lying at the intersection of organizational culture and how information is used at work. The second is *group adoption*, resolving the multiple ways of conceptualizing and measuring effective use of knowledge sharing tools. Having defined these, the central research question is then explored: what impact might information culture have on group adoption of tools intended to promote knowledge sharing and use?

This chapter unfolds in four parts. The balance of this introduction provides a general foundation for information use in workplace groups. The second section develops a definition of information culture, rooted in organizational culture and related theories that focus on behaviours and norms concerning the use of information in a group. The third section explores ways in which effective use has been conceptualized in the literature, making the case that group adoption is a useful construct for studying the role of information culture on the use of tools to support knowledge work. The final section presents empirical evidence that information culture and group adoption are measurable and clearly related.

When considering aspects of culture, workplaces, and collaborative tools, the level of analysis is necessarily the workplace “group,” a term that requires a clear definition. For some researchers, the term refers to an assembly of strangers brought together temporarily, as for a lab experiment; for others, the term denotes a stable collection of people who work together regularly. This latter definition is how “group” is used in this chapter. In the words of Guzzo and Dickson (1996), a group is one whose composition is stable over time, who work together with a set of shared goals, and:

*Who see themselves and who are seen by others as a social entity, who are interdependent because of the tasks they perform as members of a group, who are embedded in one or more larger social systems (such as an organization) and who perform tasks that affect others outside the group. (p. 308)*

What is important here is that “group” is a relatively amorphous construct; groups are bounded by their particular conditions of membership, be they formal/functional (e.g., project teams), professional (e.g., communities of practice), geographical (e.g., employees of a branch office), or predominantly social (e.g., communities of interest). Thus, within an organization, groups may be constructed at many levels, including that of the organization itself. Individuals may therefore belong to several groups in an organization, and groups may have their own distinctive norms.

### Information Processing in Groups

Most twenty-first century offices are increasingly characterized by collaboration among groups of workers using tools to support this work, as opposed to lone, individual work. There is considerable evidence that the way individuals think and use information can be quite different in a group setting than on their own. For example, it has been known for a long time that, at least in some situations, a group will outperform an individual (e.g., Chartier & Abele, 2017; Shaw, 1932) and that a group typically shows emergent characteristics that are very different in many respects than those of its individual members (e.g., Smaldino, 2014; Davis, 1969). There is also broad evidence that group discussion can produce a shift in final group consensus from the mean initial opinions of its individual members. This has traditionally been known

as a “risky” shift because the final decision tends to be more extreme or risk-oriented than mean initial opinions (Stoner, 1968). Several theories can be invoked to account for choice shift. Social comparison theory (Festinger, 1954) posits that individuals tend to fear being perceived as different or extreme and tend to initially understate the extremity of their views; this understatement then fades over the course of discussion. Self-categorization theory (Mackie, 1986; Treppe & Loy, 2017) suggests that after group members get to know each other, individuals orient their own opinions toward the group norm.

A final, compelling example of how a group processes information differently from individuals is how members of a group tend to use each other as a human system of distributed information storage. Wegner (1987) postulated that groups form a *transactive memory* system of two parts: knowledge possessed by individual group members and group awareness of who knows what. Wegner describes three key processes in a transactive memory system: directory updating, information allocation, and information retrieval. Directory updating refers to group members staying aware of what other members know. Information allocation refers to deciding which team member will hold a given piece of new knowledge, usually dependent upon that person’s expertise. Retrieval coordination refers to deciding whom to ask for a given piece of information based on the relative position of individuals in the transactive memory system. In simple terms, members of a team size up each other’s expertise, and will reflexively forward useful information to the team member with relevant expertise. While this is a courteous gesture, it is also a tacit social contract that each team member’s knowledge then becomes available for the asking. Transactive memory has been invoked in numerous studies to explain how information is shared or distributed across a group of coordinated individuals (e.g. Barnier et al., 2018; He et al., 2007).

## **Information Behaviour in Groups**

Information behaviour is a large and rich area of research, including consideration of individuals in myriad contexts, small teams, and large organizations. Case and Given (2016) describe it broadly as “the ways that individuals perceive, seek, understand, and use information in various life contexts” (p. 3), and they explicitly include assimilating new information in the process of learning. In Davenport (1997)’s similarly open definition, information behaviour is how individuals “approach and handle information” (p. 83). Davenport explicitly lists information seeking, information searching, and information use as examples of information behaviours. Choo (1998) divides information behaviour research into two types: system-centred, which features objective dimensions such as task and tool characteristics, and people-centred, where information seeking and use are the subjective experience of the user. This is a useful dichotomy, because these can be studied independently in a workplace and compared. The importance of this broad term will become evident below: group behaviour will be described as the observable part of organizational culture, and group *information* behaviour will be described as the observable part of *information* culture.

One useful theory for exploring information behaviour in groups is Taylor’s (1991) Information Use Environment (IUE), which considers the workplace setting as having a significant influence on information use in four ways. The first relates to management attitudes toward information and subsequent effects on employees. Examples include organizational structure and style, and what is rewarded. The second is the domain of the organization: some industries place a greater emphasis on information use because of the nature of the work itself, and each domain may have particular information dissemination characteristics, such as privacy strictures or an inclination to use particular software tools. Interestingly, Taylor suggests a systematic difference between public and private sector organizations, where the former

tends to employ information at the conceptual level and the latter more in practical, or instrumental use. Third, there may be policies or practices around limiting access to information, which could also include skepticism of information external to the organization. Finally, Taylor identifies history and experience as the fourth way in which organizational setting might impinge on information use. He suggests that as time passes, increasing specialization in an organization tends to compartmentalize information and inhibit lateral information flows.

## **Synthesis**

The preceding discussions of information processing in groups and group information behaviour are foundational for exploring the relationship between how groups think and behave, and the impact of these characteristics on effective use of collaborative tools to promote information use to support knowledge work. The frequent failure of collaborative information systems to live up to expectations may be due in part to a failure to adequately accommodate the ways in which groups handle information. However, how groups think and behave also coalesce into stable norms and patterns of behaviour that are typically discussed under the rubric of “culture.”

## **WHAT IS INFORMATION CULTURE?**

### **Overview**

“Culture” is a complex, nuanced term that generally describes emergent characteristics of a group with stable membership. But what characteristics? The answer depends in part on whom one asks, and in what context. In this chapter, the use of information is of central concern, so an exploration of culture will necessarily converge on information use. A stepwise approach is taken here, beginning with an overview of what is meant by “organizational culture,” and then moving to more specific terms that link organizational culture with information use: information politics and information orientation. Together, these terms frame “information culture” in terms of stable patterns of behaviour around the handling and use of information in a group setting.

### **Organizational Culture**

Organizational culture has been widely studied for several decades without consensus about how to properly conceptualize, analyze, or measure it. For Martin (2002), organizational culture is “how things are done around here” (p. 58). This is a useful and inclusive conceptual definition, but it is too broad as a basis for measuring or analyzing organizational culture. More specifically, organizational culture research can be divided into two opposing camps. The first is the management school, which sees organizational culture as a variable that can be measured quantitatively and manipulated as a force for change in the workplace. Members of the other camp, the interpretive school, see organizational culture as an enacted social construction of its participants that must be understood qualitatively, by studying its metaphorical manifestations in symbols, rituals, practices, and stories. Both camps are described more fully below. It is important to note that despite being very different, they are not mutually exclusive (Alvesson, 1993;



Alvesson & Berg, 1992). In particular, the influence of behavioural norms in a group setting is a central theme to both sides.

## **The Management School**

Because the goal of management school research is often practical – to enact top-down cultural change within an organization to improve performance – definitions from various authors tend to converge (e.g., Schein, 2010; Deal & Kennedy, 1982). Schein specifies three layers of culture: (a) physical objects, including technologies; (b) explicit shared beliefs and values; (c) underlying assumptions that may be tacitly held. The consensus in the management school is that organizational culture can be seen in terms of shared meanings concerning how and why things happen in a group. Moreover, leaders can heavily influence these by fiat and modeling. A key component of this approach is influencing or even defining behavioural norms (Dalkir, 2005; Deal & Kennedy, 1982; Schein, 2010; Schneider, 1987).

## **Interpretive School**

The interpretive school is marked by a qualitative approach to describing and deriving meaning from observable behaviours. Martin (2002) uses the term “rituals” to describe important behaviours as explicit embodiments of organizational culture. Terranova (2004) suggests that the group’s values matter a great deal too: effective use of information involves determining what is important versus background noise. Organizational culture acts as a filter or lens for this purpose by providing a set of values and norms through which information is interpreted and selected.

An important dimension for the interpretive school is how and where boundaries can be found between subcultures in an organization. Czarniawska-Joerges (1992) emphasizes the physical surroundings and material conditions of work as group boundaries in organizational culture research. Martin (2002) proposes drawing boundaries according to degree of participation within a group, which implies degrees of belonging. Culture can then be seen as a set of behavioral norms and values, enacted by the collection of individuals who interact with each other in a common environment, physical or virtual.

## **Information Politics**

One approach to conceptualizing the relationship between organizational culture and information use is “information politics” (Strassman, 1995). Strassman adopts the formulation of Davenport et al. (1992) in their analysis of 25 firms: cultural manifestations of information politics clustered into five principal types, which the authors claim to describe most organizations. The first is Technocratic Utopianism, the view that technology, rather than systematic investigation of needs and issues, will solve all problems. Talk of information, information systems, and productivity is limited to vague generalizations, and there is an emphasis on reliance upon “new abstractions that disguise old practices” (Strassman, 1995, p. 478). Decisions are therefore driven by technology and not formally tied to measures of success or to systematic consideration of user needs. Davenport et al. report that one third of the firms studied can be classified in this grouping.

The second political cluster is Anarchy. Made possible by the powerful and flexible desktop PC, this situation is characterized by an “everyone for themselves” approach. This state of affairs is not chosen but is a default position for firms where there is no information leadership, or where it has broken down.

In this state, everyone is an information manager, which is to say that information sharing is rare. The budget for information systems is dispersed throughout the organization, making it difficult to know the true cost of the collective information infrastructure. Strassman suggests that for companies of “solo practitioners” (p. 478) this may not pose a problem, but for more complex and supposedly interconnected organizations, this is a dysfunctional state.

The third cluster is Feudalism, where separate business units that may have a united internal culture compete for funding. In this state, the chief financial officer typically plays a central role, and a prime motivator is typically cost reduction. Financial matters are therefore the only shared motivation for investing in information systems (Strassman, 1995). Other important measures of the organization’s health may not be attended to or even collected. Davenport et al. report that was the most common state encountered and that the feudal dynamic made it difficult to make informed decisions for the common good. Strassman suggests that Feudal political situations can easily slip into Anarchy. Davenport et al. suggest that some cooperation can occur in a feudalist system by way of strategic alliances between executives to share a resource or adopt a useful standard.

The fourth cluster, Monarchy, is a top-down model that involves information practices being highly controlled by one powerful senior person, who can exert this influence through a formal position description, through esoteric expertise, or through control over spending. Davenport et al. see the Monarchy model as a solution that can be imposed to solve several problems created by a feudalist system where too little consensus exists for other approaches. Success of course depends heavily on the skills of the monarch. Davenport et al. add that an enlightened “Constitutional Monarchy” model, while being a top-down approach, spells out the limitations of the top and the rights of the bottom. One positive result can be information transparency, where it becomes clear to all participants what are the practices, expectations, responsibilities, and limitations with respect to information management.

Finally, Davenport et al. propose Federalism as the ideal political cluster, characterized by constructive negotiation among different units to avoid competition. Thus, Federalism copes with information politics by embracing it as part of the process. Federalist organizations are marked by strong central leadership and a cultural emphasis on cooperation and learning, and they are reliant on a high level of computer and information literacy in all areas of the organization (Strassman, 1995). Federalism implies the removal of bottlenecks created by “experts as intermediaries” (Strassman, 1995, p. 480) but does require a skilled information manager who has the support of the CEO without being controlled, as in a monarchy (Davenport et al., 1992).

The contribution of information politics to this discussion transcends the specific classification and characteristics of each type. It does so by demonstrating how organizations can be readily classified based on observable patterns of information behaviour norms. Moreover, because these patterns are stable and endowed with meaning, they represent manifestations of organizational culture, specifically as it pertains to information use.

## **Information Orientation**

Marchand et al.’s (2001) theory of Information Orientation posits that a firm must have three capabilities to make effective use of information: Information Management (IM), Information Technology (IT), and Information Behaviours and Values (IBV). The first two dimensions speak to the need for adequate organizational policy, processes, and infrastructure. The third, however, takes a distinctly “group” approach to information behaviour, conceptualized as “the capability by which a company instills the set of

behaviours and values that support effective information use” (p. 99). They suggest six important types of information behaviours and values to consider, which they derived from large-scale survey research of the perceptions of over 1000 senior managers. Two of these, *information sharing*, and *proactive information use*, are particularly important in considering the relationship between information culture and effective use of information systems.

“Information Sharing” refers to the extent of open and timely exchange of information among those who have it and use it. For effective information sharing to happen in an organization, five key pre-conditions need to be met: (a) common language use and shared meanings between parties; (b) relationship dynamics conducive to sharing; (c) trust between parties; (d) a shared purpose or common set of goals; (e) a cultural atmosphere of openness where sharing is explicitly encouraged. In addition to preconditions, the *mechanisms* for sharing, the perceived *consequences* of sharing, and the perceived *business value* of sharing may influence sharing behaviours.

“Proactive Information Use” is framed as attending to external information through formal and informal channels. Examples include seeking out signs of change in the environment, or anticipating new or impending products or market possibilities. Taking the initiative to find information, rather than passively accepting it is the distinctive hallmark of proactive information use. In addition to seeking out information, there must also be a readiness and ability to assimilate and respond to what is learned. It would be reasonable to expect proactive information use and information sharing to occur together, since they tend to be mutually reinforcing.

Marchand et al. do not separate values and behaviours, arguing that both must be considered together to achieve a holistic understanding of the behavioural aspects of information systems use. In the present context, however, it is essential to make this distinction: while values refer to what individuals perceive to be important, or what they think others perceive to be important, behaviour concretely refers to actual action. There is considerable usefulness in framing information orientation in terms of group behavioural norms concerning information use. A focus on behaviour provides a useful foundation for defining information culture. Information orientation has been used as a foundation for exploring information culture by many researchers (e.g., Choo, 2013; Hwang, 2011).

## **Synthesis: Information Culture**

There is no single accepted definition for information culture in the knowledge management literature. Widen-Wulff (2000) defines the term very generally as encompassing formal information systems, common knowledge, individuals’ attitudes, and information ethics. Davenport (1997) broadly defines information culture as “patterns of behaviors and attitudes that express an organization’s orientation toward information” (p. 84). This would even include preferences for certain types of communication channels, willingness to look to external sources of information, and the proclivity to share information. Given their breadth, both definitions certainly encompass information processing in groups, information behaviour, information politics, and information orientation as outlined above. However, a more precise and tangible definition is provided by Choo et al. (2008) who take a distinctly behavioural approach to define information culture “as those elements of an organization’s culture that influence its management and use of information ... manifested in the organization’s values, norms, and practices” (p. 793). By this definition, the phenomena of group information processing behaviour, politics, and orientation are all manifestations of information culture. Moreover, one key concept ties together all of these theories: stable patterns of observable behaviour in a work group are rooted in stable values, norms, and relation-

ships. Finally, in light of the theories reviewed above, the two Information Orientation dimensions of Information Sharing and Proactive Information Use would appear ideal proxies for the broader concept of information culture.

## **WHAT IS EFFECTIVE USE?**

### **Overview**

A robust and operational conceptualization of what constitutes effective use of information systems in workplaces is elusive. Strassman (1997) provides the agreeable but nebulous statement that “the effectiveness of a computer is largely dependent on its capacity to enhance the health or worsen the malaise of organizational units” (p. 4). This raises numerous questions such as what level of analysis is appropriate, what dimensions of success are important, which can be measured, and whether objective or subjective measurements are desirable.

Attempts to conceptualize and measure the success of information systems are as old as the earliest systems, but they grew in the 1970s where there was a major emphasis on cost-benefit analysis (e.g., Montgomery & Benbasat, 1983; Sethi et al., 1993). Later, interest developed in measuring the adoption rate of systems (Reich & Benbasat, 1990; Rice, 1994). The business process re-engineering *zeitgeist* of the 1990s brought a measurement emphasis on “alignment” of systems with the needs of the organization (Miller, 1993; Strassman, 1997). Other directions have been pursued as well. Frokjaer et al. (2000) defined systems success in terms of usability, measured with the constructs of effectiveness, efficiency, and satisfaction. Some theoretical approaches ignore the effects of the group in favour of focusing on the autonomous individual and their own immediate environment. However, as framed by the preceding discussion of group information behaviour and information culture, there is value in extending consideration to the social context of the individual as a member of a group. A number of leading theories of both types are briefly reviewed, together with a summary of their limitations.

### **Effective Use Measurement for Autonomous Individuals**

Two well-known theories that focus on the individual and their own context, perceptions, and attitudes, are briefly presented below. The reason for exploring these is simple enough: if it is possible to adequately explain why an information system is used well wholly in terms of the individual, then a consideration of information culture will not add any explanatory power and may not achieve much. Conversely, if such theories are found to be limited in their ability to predict how group members use technology, then there remains a motivation to consider the influence of the group.

### **Task-Technology Fit**

A typical approach to defining “fit” in the information systems effectiveness literature is simply, and more holistically, “the extent to which a particular task can be performed effectively and efficiently with a particular technology” (Mathieson & Keil, 1998, p. 222). Thus if the user’s mental model of the problem does not match that implied by the tool, fit is poor and effectiveness is low. Such an approach is attractive in its simplicity, and there is some empirical evidence for the validity of a task-technology

fit approach to evaluating information systems (Howard & Rose, 2019). However, Dishaw and Strong (1998a; 1998b) found that while fit predicted individuals' behavioural *intentions* in a group setting, it did not predict actual use particularly well (1998a, p. 170). This gap between intention to use and actual use implies that there is something intervening between the individual, task, and tool use that cannot be explained solely in terms of the individual.

## Technology Acceptance Model

The Technology Acceptance Model (TAM) was introduced by Davis (1989) to describe the influence of individuals' attitudes on willingness to use workplace information technologies. Specifically, the TAM seeks to predict the usage of information systems based on individuals' judgements of perceived ease-of-use and perceived usefulness. Davis defined perceived ease of use as "the degree to which a person believes that using a particular system would be free of effort," and perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320).

The TAM is certainly a more holistic and subjective perspective than the functional approach taken by task-technology fit, but the main outcome measure is the same: the individual's declared behavioural intentions. In the three decades since its introduction, the TAM has shown robust predictive ability for actual use of a variety of information technologies, and it remains a dominant model in the literature for information systems success. However, when applied to collaborative information systems, the same gap between intention to use and actual use emerges (Dasgupta et al. 2002; Malhotra & Galletta, 1999). Studies have since added social influence elements to TAM research and found improved prediction of actual behaviour to varying degrees (Bashir and Madhavaiah, 2015; Beldad & Hegner, 2018; Venkatesh & Davis, 2000). The implication here is not a diminishing of the TAM for contexts involving individuals alone, but rather the importance of social norms at least in some circumstances. Thus a major limitation of the TAM, similar to Task-Technology Fit, is that while it consistently predicts behavioural intention to use, it has not been particularly good at predicting actual use when applied in a group setting.

## Extending Measurement to Social Context

### Overview

Three leading theories that include social context in their quest to explain information systems effectiveness are described below: the Unified Theory of Acceptance and Use of Technology, which adds a social dimension to the TAM discussed above; the classic Diffusion of Innovations Theory; and the dominant theory, the Information Systems Success Model. All three have been used extensively in the literature, with some success beyond those focused on the autonomous individual. However, each also has significant limitations, and none is ideal for studying the impact of information culture.

### The Unified Theory of Acceptance and Use of Technology (UTAUT)

With the goal of finding a unified conceptualization of technology adoption, Venkatesh et al. (2003) devised a larger framework that includes the TAM, but which also includes "Social Influence," "Facilitating Conditions," and "Voluntariness." Social Influence was defined as whether the individual

perceived that persons of importance wanted the system used, in a similar manner to the social influence extension of the TAM discussed above. Facilitating Conditions refer to the organizational and technical infrastructure, which could be positively or negatively oriented toward use. Voluntariness describes the extent of discretion or choice that individuals have in structuring their work. However, the authors were unable to find main effects of Social Influence when testing the UTAUT, nor did subsequent studies find stability of measurement over time for Facilitating Conditions, limiting the usefulness of this approach (Fichman, 2000). More recently, Dwivedi et al. (2019) added “Attitude” to the UTAUT model, but still found a low association between social influence, behavioural intention, and actual use.

## Diffusion of Innovations Theory

First advanced in 1962 by Everett Rogers, Diffusion of Innovations Theory (DOIT) seeks to explain adoption of innovation through members of a social system, including organizations (Rogers, 2003). DOIT research focuses upon factors that can encourage or inhibit the adoption among members of a group or social system. Rogers (2003) discusses social systems as “a set of interrelated units that are engaged in joint problem solving to accomplish a common goal” (p. 23). He adds that a social system can either facilitate or discourage innovation, depending on the “norms, the established behaviour patterns for the members of a social system” (p. 37). In addition, Rogers explores behavioural categories to account for the typically observed bell-shaped distribution of adoption behaviour: early adopters, early majority, late majority, and laggards. This storied adoption curve has found its way into common parlance because it appears to explain the success (or failure) of technologies in a group environment. However, the outcome of interest in DOIT research is typically purchase of a technology, not effective use once purchase has taken place. Thus “hype” or technology “fashion” might drive behaviour more than what some researchers have called *infusion* of technology: the extent to which the technology is being used to its full potential (Zmud & Apple, 1992). Moreover, Gallivan (2001) argues that the traditional lens of diffusion of innovation research, which implies complete individual autonomy and volition, is not suitable when studying the complex realities of an organizational context, where social interdependencies among organizational units and individuals may eclipse individual predilections. Additional support for this view comes from the work of Harvey (2014).

## The Information Systems Success Model

DeLone and McLean (1992) formulated a temporal causal theory, the Information Systems Success Model, subsequently revised and simplified in 2002. It holds that user perceptions of *system quality* and *information quality* have an impact on *actual use* of the system and feelings of *user satisfaction* with the system. The outcome measure is a holistic perception of “net benefit” to the organization. The implication is that by posing questions to users about perceptions of overall net benefit, perceptions of the four main variables are being gauged. This model has an advantage of avoiding *intention* as a proxy for effective use, and it now dominates the discourse of information systems (IS) success measurement because it effectively consolidates most previous research into dimensions that are testable. Moreover, the model shows good predictive power in numerous replications and adaptations (e.g., Stefanovic et al., 2016; Dwivedi et al., 2013), having been cited 144 times in the seven years following its initial publication (DeLone & McLean, 2002). Attractive as this model is, there is a limitation: low actual use may be driven by strictures of information culture – group norms – and these are not represented in the model.

Therefore, if measurements of perceived net benefit happen to be low, there can be no way to attribute these to information culture. A more useful way to examine the relationship between information culture and use of knowledge tools at work would be explicitly behavioural, rather than an approach based on individual attitudes. Group Adoption is just such an approach.

## **Group Adoption**

### **Conceptualizing Adoption**

The preceding review of information systems adoption research considered a number of variables and theories concerned with judgments and attitudes on the level of the autonomous individual, with and without consideration of their social context. None of these readily accommodates information culture, however. To do so requires an approach that focuses on norms of behaviour around information systems: the adoption of a technology by the group, as opposed to judgments of the technology by individuals.

But what do we mean by adoption? There are numerous terms in use by different researchers, including “uptake,” “use,” “acceptance,” “implementation,” “routinization,” “acquisition,” and “assimilation” (America, 2006). Such a plethora of terms, rising from different theoretical origins with differing operational emphases, underscores a prior lack of theoretical and operational consensus as to what adoption of technology by individuals in an organizational setting should encompass. Some authors explicitly define adoption simply as an organization deciding to purchase the technology, or they provide no definition at all (e.g., El-Haddadeh, 2020). While that makes for convenient and unambiguous measurement, the validity of simple binary choice at the level of the organization omits the range and complexities of individual behaviour within the boundaries of an organization. Group behaviour can extend to rejecting a system outright or subverting it, even using it ironically (Ali et al., 2016).

The purchase of a tool by an organization is a pre-requisite to adoption, but it overlooks whether a group actually develops norms around use of the tool. It is possible to conceptualize adoption at the level of the group and still measure it with reference to individual behaviour. Where the context is an organization, many researchers have converged upon a multi-stage adoption model, following Rogers (2003): the organization makes the decision to deploy in the first stage, and top-down organizational support to encourage uptake by individuals then follows (Graham et al., 2013; Hameed et al., 2012). Klein and Sorra (1996) describe a process of achieving routine use via an implementation process as “the transition period during which organizational members ideally become increasingly skillful, consistent and committed in their use of an innovation, ... the critical gateway between the decision to adopt the innovation and the routine use of the innovation within an organization” (p. 1057).

### **Defining Group Adoption**

There is no consensus in the literature about adoption of technology by individuals, let alone the more complex question of adoption by the group. In both cases, there is a broad and problematic emphasis in the literature on equating adoption with purchase or installation. Clearly, equating acquisition with adoption is not appropriate, particularly in a workplace setting where the functions of deciding to purchase, installing the technology, and then using it are all likely to be performed by different individuals or groups.

However, some researchers have oriented to consideration of the influence of the group (Bayerl et al., 2016; Sarker & Valacich, 2010). Gallivan (2001) proposes a theoretical framework for group adoption

that begins with a corporate decision to use and then proceeds to subjective norms (i.e., influence from coworkers, subordinates, senior management) together with “facilitating conditions.” This stage then leads to “assimilation” behaviours at the individual level, including “routinization of use,” “integrative use,” and “infusion,” based on the work of Cooper and Zmud (1990).

*Routinization* as a measure of adoption was first explored by Yin (1979) and was characterized by the extent to which formal rules had been adjusted to include the innovation. Zmud and Apple (1992) extended this conceptualization of routinization to the adjustment of social systems and work processes to accommodate the new technology, measuring whether its full potential had been reached in terms of how *embedded* it had become in work practices, policies, and procedures. Embeddedness in this sense closely resembles the concept of “mutual adaptation,” where adjustments are required to both the technology and the work processes it is meant to support, to have an effective implementation (Leonard-Barton, 1988). Routinization and embeddedness can be seen as behavioural expressions of group norms in the adoption of new technology. For routinization, the link to the normative influence of the group is one of individual habit that has resulted from the influence and practices of coworkers. For embeddedness, the link to the normative influence of the group is the extent to which the technology has been integrated into work practices within the group, and therefore the extent to which it has come to be relied upon. It is deliberate that no distinction is made between embeddedness in work practices that is formally documented, and that which is informally understood among coworkers; in both cases, it is the degree of embeddedness itself – the adoption *behaviour* – that is important, not the *means* by which it is understood or documented.

From this discussion, a clear definition of group adoption can be formulated: group adoption is a measure of participant perceptions of the degree of routinization and embeddedness of a particular technology by a group in work practices. The measurement research on Group Adoption presented below adds one important refinement: routinization and embeddedness are so highly correlated, that they need not be considered separately in measurement.

## **MEASURING INFORMATION CULTURE AND GROUP ADOPTION**

### **Overview**

A quantitative case study to measure information culture and group adoption was undertaken at EngCo, a medium-sized engineering firm with a staff of 120, located in Brampton, Ontario. After struggling for some time in a competitive environment, EngCo decided to improve its use and management of its stores of information and intellectual capital. The company hired a Chief Knowledge Officer (CKO) to oversee this task. Open communication and knowledge sharing among employees were set as important objectives. The CKO introduced a collaborative software tool, Knowledge Exchange (“KX”) for sharing and building upon engineers’ ideas, to document technical knowledge creation and decision-making, and to provide easy re-use of this knowledge in lieu of repeatedly solving similar problems. Ninety percent of the staff participated in the research, which involved a lengthy questionnaire instrument that included the TAM, the Information Systems Success Model, Information Culture, and Group Adoption. Individuals’ questionnaire responses were matched with system logs that provided granular detail about the amount of actual use of the system by each employee. A complete account of the research methods and statistical analysis summarized here can be found in Furness (2010).



## Information Culture and Effective Use of Information Tools at Work

The goals of the research were twofold. The first goal was to search for correlations between Group Adoption and each of the TAM and Information Systems Success Model, as well as with actual use data, to assess whether Group Adoption is a valid proxy for effective use. The second research goal was to search for correlations between Information Culture and Group Adoption, which would provide empirical support for a relationship between these major constructs.

### Measurement Instrument Validation

The Information Culture and Group Adoption instruments are shown in Tables 1 and 2, respectively. Each item was rated on a 7-point Likert Scale. A Principal Components Analysis was performed on each instrument, as shown in each table. Items with factor loadings of 0.600 or higher and only on the appropriate component alone were retained. For Information Culture, eight items were retained, and the two expected components, (Information Sharing and Proactive Information Use) clearly emerged. For Group Adoption, five items were retained, but only one component emerged, each with high factor loadings and a Chronbach's Alpha value of 0.80.

*Table 1. Information culture questionnaire items and factor loadings.*

Information Culture Items: "Among the people I work with most closely, it is common practice to ..."	Component:	
	Proactive Information Use	Information Sharing
1. "...distribute information only on a need-to-know basis"*	-.006	.602
2. "...treat information as sensitive and confidential"*	-.201	.815
3. "...check with someone before sharing documents elsewhere in the company"*	-.155	.727
4. "...be certain of accuracy before passing on information"	.741	-.207
5. "...locate and use information about best practices and lessons learned"	.811	-.143
6. "...keep abreast of new developments at work"	.795	.009
7. "...read journals or other publications related to our occupations"	.570	-.360
8. "...take the initiative to learn new things"	.832	-.007

\*Reverse coded

*Table 2. Group adoption questionnaire items and factor loadings.*

Group Adoption Items	Component: Group Adoption
1. "It is assumed that KX is part of one or more tasks at work"	.694
2. "It is standard practice to use KX in one or more particular situations"	.765
3. "KX is part of a routine to keep abreast of new ideas or information"	.825
4. "Getting work done would be hampered if KX were down or unavailable"	.700
5. "The use of KX is integral to one or more work activities"	.811

This analysis demonstrates that both instruments performed adequately to operationalize Information Culture and Group Adoption. This finding enables the second part of the analysis: a search for relationships between Group Adoption, and each of the TAM, the Information Systems Success Model, actual use data, and Information Culture. Finding significant relationships would help validate Group Adoption as a useful construct and measurement tool.

### Group Adoption Validation

Group Adoption had multiple significant correlations, as shown in Table 3. Actual use data collection and analysis is described in Furness (2010) along with the Information Systems Success (“Net Benefit”) instrument. As predicted, Group Adoption was significantly correlated with all three measures of effective use: actual use data, the TAM, and Net Benefit.

Table 3. Pearson correlation coefficients (r) for Group Adoption.

Measurement Instrument	Group Adoption
Actual Use Data	0.22*
TAM	0.66*
Net Benefit (Information Systems Success)	0.75*

\*p < 0.01

It is also notable that no significant correlation was found between the TAM and actual use data, as expected: the behavioural norms of the group regarding the KX tool presumably overrode individual judgements of ease of use and usability. However, Group Adoption clearly *did* have a significant relationship with *both* the TAM and actual use data. Group Adoption may therefore help provide an explanatory bridge between the TAM and actual use data in a group context.

### Information Culture and Group Adoption

Both Information Sharing and Proactive Use of Information were found to have modest and significant correlations with Group Adoption. There is therefore a meaningful relationship between both measures of Information Culture and Group Adoption. Unexpectedly, however, each measure was observed to be in opposite directions.

Table 4. Pearson correlation coefficients (r) for group adoption.

Information Culture	Group Adoption
Information Sharing	-0.34*
Proactive Use of Information	0.40*

\*p < 0.01

## **Information Culture and Effective Use of Information Tools at Work**

This evident disparity was explained upon interviewing research participants; those employees who were oriented to proactive use of information tended to embrace the system, whereas those who oriented to sharing information were extremely frustrated with how cumbersome this was, and they also did not clearly see that their efforts to share were making much difference.

Interestingly, most participants rated themselves highly in *either* sharing *or* proactive use, but not both. This suggests there may be an important, unrecognized dichotomy among employees: those who orient to supplying information to others, and those who orient to consuming it. Moreover, these two types of employees appear to have had markedly different use experiences with KX, which was evidently more satisfying for those seeking information than for those sharing it. Consequently, measuring *both* Information Culture *and* Group Adoption in an organization may be particularly helpful in diagnosing aspects of an information system, such as effort to contribute information versus effort to retrieve information. This important difference would likely have otherwise gone unrecognized.

### **Summary and Synthesis**

Both the Group Adoption instrument and the Information Culture Instrument were validated with a Principal Component Analysis, enabling additional comparisons. Group Adoption had significant correlations with the TAM, actual use data, the Net Benefit instrument, and with both dimensions of the Information Culture instrument. In addition, the correlations between Group Adoption and Information Culture appears to have discriminated two different types of group members: those oriented to proactive use of information, and those oriented to sharing information. Finally, whereas the TAM was not significantly correlated with Actual Use, Group Adoption was correlated with both, raising the possibility that it may represent a key dimension missing from the TAM.

## **SIGNIFICANCE OF THE RESEARCH**

### **Implications for Practice**

The primary application of group adoption measurement is a success metric for information systems in knowledge-oriented collaborative work, where use is at least somewhat discretionary. Guthrie et al. (2017) used the group adoption instrument to document the successful uptake of an innovative GIS-based tuberculosis case management system, among a distributed network of public health nurses.

A practical benefit of asking about group adoption is that the measurement is focused on behavioural norms rather than simply perceptions of outcome, facilitating insight about causes. If measurement of group adoption is paired with measurement of information culture, a very clear picture may emerge, framing problems in an eminently actionable way. Either specific behavioural norms can be targeted for change through carefully designed interventions, or workflow and tools can be adjusted to resolve conflict with established norms. In the case of KX, modifying the tool specifically to make sharing easier may have been sufficient to foster effective information use among employees.

However, as with many quantitative instruments, augmenting group adoption and information culture measurement with interviews is recommended, particularly if quantitative ratings appear to diverge a great deal. In the case of KX, two types of users were strongly differentiated in their appraisal of the system based on their inclination to share versus consume information from others. This deeper understanding

was established through discussion with participants. In other workplaces, there may be different predictors of group adoption which may also be properly understood through conversation.

## **Limitations and Future Research**

The research presented here has framed a new way to measure success of information systems, using an information culture lens and a group adoption yardstick. However, there are five principal limitations, each of which suggest possibilities for further research. The first limitation is that information culture was operationalized in a narrow way, using two salient dimensions from Information Orientation theory. However, organizational culture is complex, and complex phenomena cannot typically be adequately represented by reduction to simple variables. Other dimensions of information culture, such as trust, assumptions, and values, may also prove to be useful to explain group adoption success or failure in different context. A second limitation concerns generalizability to other settings where degree of autonomy in tool use may be either greater or lesser than the engineering firm studied here, and the public health setting reported by Guthrie et al (2017). Applying the group adoption measure to a wider range of work settings is needed to establish whether group adoption proves robust in many different settings.

A third limitation pertains to applicability to emerging technologies, such as smart phones, tablets, voice recognition systems, and the Internet of Things. It is not clear that group adoption will have advantages over Diffusion of Innovation theory for truly novel technology in workplaces. More research is needed to explore whether group adoption will also prove robust for innovation. Fourth, the sudden rise of sustained remote work, spurred by the COVID-19 pandemic, needs to be considered: the normative influence of the group may manifest differently, or to a lesser degree, among a distributed workforce. Again, research is needed to explore group adoption in non-traditional work settings.

Finally, the observed phenomenon that employees classified themselves as either high sharers *or* high consumers of information cries out for further measurement in a variety of knowledge-intensive organizations. If this dichotomy proves to be robust across different settings, there may be important implications for user needs analysis in the design of information systems.

## **CONCLUSION**

This chapter began by framing three complex and inter-related problems for stable groups in the workplace: (a) establishing a conceptualization of information culture; (b) developing the “group adoption” construct as a useful way to measure effective use of information systems; and (c) evaluating empirical evidence concerning the influence of information culture on group adoption.

The empirical evidence from a case study of an engineering firm appears to uphold group adoption as a useful proxy for effective use of information systems. The argument in favour of group adoption is twofold. First, it is significantly correlated with the existing state of the art in measuring information systems effectiveness, as well as with actual use. Second, it is explicitly behavioural. Consequently, it facilitated exploration of the central research question: does information culture influence the use of tools for information sharing and use? The answer appears to be a firm yes.

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## KEY TERMS AND DEFINITIONS

**Group Adoption:** The extent to which a tool or technology has become embedded and routinized in work. Embeddedness refers to growing dependence on the tool as it becomes integrated into work practices. Routineness is a measure of the extent to which use is habitual, and not matter of frequency of use. However, these two dimensions are highly correlated and not distinguishable from each other in the Group Adoption instrument. See Furness (2010).

**Information Culture:** A subset of organizational culture concerned with norms, values, and patterns of behaviour that influence how information is used in an organization. Group information processing, information orientation, and information politics are all manifestations of information culture. Like organizational culture, there is an emphasis on observable, stable patterns of behaviour for conceptualization and measurement. See Choo et al. (2008).

**Information Orientation:** Three capabilities that a firm requires to make effective use of information: Information Management, Information Technology, and Information Behaviours and Values (IBVs). There are six IBVs: Information Sharing, Proactive Information Use, Information Transparency, Information Integrity, Information Formality, and Information Control. See Marchand et al. (2000).

**Information Politics:** The interplay between structure, power, and information use in organizations, providing a categorical perspective on organizational culture. There are five main forms of organizational information politics: Anarchy, Feudalism, Monarchy, Technological Utopianism, and Federalism. See Davenport et al. (1992).

**Organizational Culture:** “How things are done around here,” comprising a set of shared norms, behaviours, and values. The management school posits that organizational culture can be directed by top-down leadership; the interpretive school sees culture bottom-up enactment by groups. Both agree that observable, stable patterns of behaviour provide a means for quantitative and qualitative measurement. See Martin (2002).

**Principal Component Analysis:** A statistical procedure that is used to identify which items in a questionnaire are highly correlated with each other. Clusters of correlated items indicate the presence of an underlying, independent construct or 'factor'. This procedure can be used to verify expected constructs in a questionnaire, or to discover new ones.

**Technology Acceptance Model (TAM):** This model posits that a person's behavioural intention to use a given technology can be predicted by their assessment of "perceived ease of use," and "perceived usefulness." Behavioural intention, in turn, can predict actual use. This model has been shown to be robust with a wide range of users and technologies. However, it does not perform well in contexts of group behaviour. See Davis (1989).

# Chapter 16

## It's in the Vault: A Case Study of Lessons Learned From Rebuilding Shopify's Company-Wide Wiki

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### ABSTRACT

*This chapter is a case study of the rebuild of Shopify's internal wiki (intranet) and describes the approach of updating the wiki and explores the elements that made the project a success. The problems with the existing tool are presented along with the strategies used to remedy these issues and rebuild the wiki. The project harnessed Shopify's culture of trust, accountability, and transparency to create a tool authentic to the needs of the company. At the heart of the project's approach is the people, process, and technology trifecta that the project team was built upon. This cross-functional team intersected change management, communications, knowledge management, and developers. Readers of this chapter will learn the approach and methodology of composing a project team based on this trifecta and how it led to the successful rebuild of Shopify's wiki. Although Shopify had the opportunity to build its tool internally, this chapter is not a showcase of the tool; the focus is on the approach and strategies of the project team, which can be applied to any intranet-like project.*

### INTRODUCTION

In May 2019, Shopify re-launched its internal wiki, seven years after the wiki was built in-house, as the company had outgrown the original features and functionality of the tool and its content had become disorganized and largely out-of-date. Shopify's employees had lost trust in the wiki and a project team was assembled to update the tool and organize its content. The rebuild of the wiki, called "the Vault," was constructed on five main pillars:

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## ***It's in the Vault***

1. Form a cross-functional team based on the people, process, and technology framework.
2. Integrate change management practices that engaged participation from employees across the company to enable trust in the tool to be regained.
3. Design an information architecture (IA) and plan a content migration strategy that ensured the updated wiki was organized in an intuitive structure with content that was relevant and up-to-date.
4. Promote the new wiki before and after its launch to keep all employees informed and involved in this change.
5. Integrate metrics throughout the project, from the early decision-making stage of the wiki rebuild to measuring engagement post-launch to determine the adoption and success of the new wiki.

Founded on these pillars, the strategy of the Vault's rebuild enabled the new wiki to connect Shopify's employees to the information they need, when they need it.

This chapter will outline how the knowledge management (KM) team and wiki project team at Shopify applied these five pillars to evaluate, rebuild, and launch an updated wiki experience that strengthened the company's knowledge sharing culture. Shopify's company culture will be explored in order to understand the unique beliefs, behaviours, and espoused values the project team had to consider to achieve an aligned and successful wiki update. The technical, cultural, and knowledge sharing issues of the outdated wiki and the strategy to address these issues will be examined. The chapter will explain the philosophy behind the structure of the project team and the critical role this structure played in a successful rebuild and launch. The project team's approach to change management, information architecture, communications, metrics and content maintenance are explored and connected to the enhancement of a knowledge sharing culture at Shopify.

## **REBUILDING AND LAUNCHING SHOPIFY'S INTERNAL WIKI**

### **Organizational Background**

Shopify is the leading cloud-based multichannel commerce platform for businesses to design, set up, and manage their stores across multiple sales channels. This includes web, mobile, social media, marketplaces, and brick-and-mortar locations. The Shopify platform provides merchants with a powerful back-office and a single view of their business. As of early 2021, Shopify powers over a million businesses in approximately 175 countries (Shopify, 2021a). Internally, Shopify is a product-first company with a commitment to maintaining and practicing company values, which contributes to its unique culture of trust, accountability, and transparency. Shopify has codified espoused values, which are integrated into all aspects of company work to ensure they are enacted and embraced by employees (Shopify, 2021b). These values are reviewed on a regular cadence to ensure they are authentic to the company and fit the current environment. Through this process, Shopify attempts to ensure that espoused and enacted values are in concordance.

Shopify has a tech culture that is powered by a trust battery. The philosophy behind the trust battery is that Shopify trusts its employees and believes everyone is capable of making their own decisions. The company fosters a culture where employees are empowered to conduct their work in an environment that allows them to champion initiatives, make decisions, and fail forward if a project does not produce the expected result (Bryant, 2016). Internally, the company defaults to open, this concept of open by default

means Shopify shares internal knowledge based on what not to share, instead of what to share. Shopify shares all context with its employees except what cannot be shared legally (Wood, 2016). Default to open emphasizes context sharing, which is what Shopify calls knowledge sharing, this includes the quarterly letter to the Board of Directors and hosting regular ask me anything (AMAs) with executives. Although Shopify is transparent with its communications internally, it defaults to secrecy externally. Another core value of the company is to be constant learners. Shopify recognizes that everyone's abilities improve with practice, effort, and continuous learning (Pradhan, 2018). This value makes it possible for everyone at Shopify to continue learning and share their knowledge with other employees.

One of the main tools used at the organization to share knowledge is the internal wiki, which is part of the company's intranet, where employees can also manage their projects, view the organizational structure, and give kudos to their colleagues. Every employee at Shopify can contribute their knowledge to the Vault. Shopify is a research and development (RnD) company and this influences how products are developed and projects are approached within the organization. The process is an iterative one and launching a minimal viable product (MVP) is encouraged instead of waiting for it to be perfected. This iterative approach allows for a product to be built and launched as an MVP and for its features to be further developed after the product is live (Abbamonte, 2019). As an RnD company with a large team of developers and engineers, Shopify had the unique opportunity to build its intranet in-house.

## **Culture at Shopify**

Janz and Prasarnphanich (2003) write, "Organizational culture is believed to be the most significant input to effective KM and organizational learning in that corporate culture determines values, beliefs, and work systems that could encourage or impede knowledge creation and sharing" (p. 353). The company culture at Shopify is distinct and powered by the company's mission, values, and rules of engagement. Shopify's mission is to "Make Commerce Better for Everyone," and everything built at the company is done in work towards this mission (Shopify, 2021). The culture at Shopify is created and maintained by the beliefs and behaviours of everyone at the company, and every single employee influences the cultural environment through their everyday actions and interactions. At Shopify, its culture is owned by everyone. Feedback is also seen as a gift and should be given and taken on a regular basis. Shopify recognizes that, as a company, it was built on hard work and continuous learning. Everyone at Shopify is encouraged to own their own development and to be always continuously learning and sharing their knowledge with fellow teammates. This learning and sharing culture naturally flows into the company's approach to defaulting to open internally. For any internal project to be successful at Shopify, considerations of its culture would need to be integrated into all decisions (APQC, 2019).

The Vault is one of the tools that enable Shopify's employees to share their knowledge quickly and easily while minimizing the politics of who has access to what. In action, Shopify's culture can be demonstrated by its Town Hall. Town Hall is a weekly event for the entire company where teams and leaders are provided the opportunity to promote their work, share product development, and discuss company objectives. This creates an environment of open context sharing that builds trust in the work that employees are conducting. The trust battery allows the company to default to open internally, and the Vault is no exception to this rule. A cornerstone of the new wiki project would continue this concept, outside of the homepage (which is used for company-wide announcements), anyone can contribute context or edit any page in the Vault.

## ***It's in the Vault***

According to Schein (1985), culture exists at three levels within organizations: basic assumptions, values, and artifacts. Basic assumptions are the beliefs and understandings employees develop to navigate, strategize, and build relationships in their environment. Values are the manifestation of this culture and are the accepted and declared norms of the organization. At Shopify, the widely popularized mission “Make Commerce Better for Everyone,” the analogy of the “trust battery,” and the company value to “Be a Constant Learner,” are examples of values that help define what behaviours and attitudes are encouraged at the company. Artifacts, in Schein’s model, are the third level through which culture is manifested, and are the most visible at organizations. They can include rituals, design, language, technology, and beyond, and they are used to confirm and shape values (Burkus, 2014). Town Hall and the Vault are examples of cultural artifacts at Shopify. They are shaped by the culture of Shopify, but also designed to reinforce the values of trust, accountability, and transparency.

## **Wiki Problem Statement and Vision**

The Vault was built by the CEO of Shopify, Tobi Lütke, in 2012 over a weekend, to create a space for the start-up’s employees to capture and share their knowledge. At the time, Shopify had approximately 150 employees, and for seven years, the Vault served as the tool to share information internally. As a company of mostly developers in 2012, the wiki was formatted for content to be written in Markdown, which is a coding language. The pages of the wiki were not organized in a structure and content could only be grouped together by coding a sidebar into a page and linking related content. Governance was limited to a simple banner that would appear on a page after a set amount of time to indicate that the page’s content needed to be verified and a mass email was sent to notify everyone of a page flagged as out-of-date. As a small start-up company, the wiki built in 2012 fit the needs and culture of the company at the time; however, by 2018, the company had grown close to 5,000 employees. Employees were working across multiple time zones as well as remotely, with remote workers feeling the pain caused by the lack of features more than in-office employees. The Vault now required updates and enhancements to meet the company’s growing information sharing needs.

During these years of rapid growth, trust in the wiki and the content it housed was lost. The functionality available in the Vault became limited and the wiki often crashed if too many employees were using it at the same time. The tool was not intuitive to use for everyone at the company as the editing experience required an understanding of Markdown, and increasingly many of the employees were not developers. The wiki had little to no information architecture (IA) or content structure, and much of the content in the tool was out-of-date as there was no clear page ownership and teams were not encouraged to verify their content. As a result, people began to house their content in other tools such as Google Docs and microsites, which created more repositories of information and fragmented the discoverability process. The Vault was not scaling with the growth of Shopify. The update of the wiki was necessary, as Shopify needed a single source of truth that employees could use to share and gain important company context as well as find answers to frequently asked questions.

Throughout the project, data and metrics were gathered to validate the need to update the tool and were later used to measure the success of the new wiki. In the legacy Vault, the average number of days since a page in the wiki was last edited was over 500, with no page ownership it was no one’s responsibility to update a page’s content. There were over 450 broken links in the legacy wiki, each of those resulting in a dead end and a moment where someone could not find the information they needed when they needed it. Finally, 41% of pages were not organized into a directory. This meant that 1,400 pages

were at the top-level of the directory creating the same frustrating experience as having 1,400 files sitting on a computer desktop. This disorganization made the serendipitous discovery of related content nearly impossible because “like” content was not grouped together. Grouping “like” content together enables the beneficial discovery of related information, this curation acts as a “you may also be interested in” function. In order to regain trust in the Vault’s content, a key approach of the project was to only migrate content from the legacy wiki that was relevant and up-to-date to the new wiki.

A 2012 survey conducted by McKinsey Global Institute discovered that, on average, 28 hours per week were spent writing emails, searching for information, and collaborating internally. With the abundance of out-of-date and disorganized information in the legacy Vault, this time spent searching for information was exacerbated at Shopify. Shopify’s employees had lost trust in the Vault and a project team was assembled to recharge its trust battery. The project to update the wiki began in late 2017, and the new wiki launched in May 2019. McKinsey’s research estimated that adopting technologies that enhance communications and collaboration, such as organized wikis and intranets, could improve worker productivity by 20% to 25%. The new Vault would include features that created an intuitive user experience that encouraged everyone to contribute relevant context. These changes aligned with the three characteristics McKinsey defines as being integral to social technologies:

1. First, they are enabled by information technology.
2. Second, they provide distributed rights to create, add, and/or modify content and communications.
3. Third, they enable distributed access to consume content and communications.

To increase participation in the creation of content and create an easy user experience, the Vault moved away from requiring content to be added via code (Markdown) to a What You See Is What You Get (WYSIWYG) editing experience. WYSIWYG editing presents content in a form that resembles its appearance when it is displayed as a page in the Vault, versus Markdown, which required users to first write a Vault page in code and its final presentation could only be viewed after the page was published. To ease access to content, new features were designed including an information architecture to give the tool a navigational structure. The Vault was also designed for mobile navigation so it could access information from any device. Page ownership was introduced to encourage accountability for teams to keep their content up-to-date and users were empowered to reach out to teams if they had questions about their content by providing the team’s contact information directly on the page. While these new functionalities would make the tool easier and more engaging to use, they did not tackle the overarching problem of out-of-date content in the wiki, and a major component of the launch of the new tool would be migrating and organizing only relevant and accurate content from the legacy Vault over to the new tool.

## **Strategy for Updating the Wiki**

Schwalb and Taffet (2017) state that the wiki is the digital manifestation of the company. As Shopify grew, its digital manifestation, the Vault, was not scaling with the growth of the company. It had become apparent that the tool needed to be updated in order for its context to be reliable. A key to updating the wiki was defining the purpose and function of each major tool used at the company. The Vault serves the purpose of providing an easy to remember, source of truth location for context that everyone at the company should have access to. Slack serves the purpose of instant ephemeral communication between employees, while Google Drive is for team specific context, slide decks, and collaborative documents.



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As content in the Vault had become outdated and untrusted, it became critical to advocate for a single source of truth platform, provide guidance on what context belonged in the Vault, and give direction on how to organize this content. Teams with highly consumed content, such as Human Resources (HR) information, were provided tailored, one-to-one guidance on how to organize their content to create a foundation of trusted content in the Vault. This acted as encouragement to other teams to bring their fragmented information back into the wiki.

The project initiative to update the tool went through several attempts of starting from the grassroots level, but once executive sponsorship became involved, the commitment to update the wiki was solidified and led to the creation of an official project team. From the onset, the project team included developers who made up the project's technology team and included representation from KM. The involvement of the KM team was an important first step in the development of the project team's structure. While technology is a key piece of digital transformations, many intranet projects fail as they are considered solely an IT issue (Pernice & McGovern, 2016). Another aspect of the strategy that was key to the success of the project was aligning with the company's overall mission (Robertson, 2013). Shopify's mission to "Make Commerce Better for Everyone" is enabled by its employee's ability to find the context they need when they need it. As the wiki was not scaling with the growth of the company, it was also no longer fuelling the mission. Shopify's mission defined a clear priority that acted as a blueprint for the activities the wiki needed to propel. This included the ability to share information, find employees via a directory, give kudos and feedback, and manage projects.

To begin the clean up of out-dated and irrelevant content in the wiki, the project team presented at Town Hall with a call to action for employees to clean up the legacy Vault. The reception to the presentation was positive and attendees expressed their interest in doing their part to clean up the wikis content. However, the call to action proved to be a failure. The presentation had been en masse, which led to only a few individuals participating in the content clean up. People did not know where to start with updating and deleting content, and they did not know how to prioritize this task amongst their daily work and operations. This call to action fell victim to the "Bystander Effect," which is a social psychological theory that individuals are less likely to offer help to a victim when other people are present; the greater the number of bystanders, the less likely it is that one of them will help (Darley & Latané, 1968). Since the clean up was presented as everyone's responsibility, it became no one's responsibility.

## **Curating the Project Team**

The people, process, and technology (PPT) form a framework that balances people, processes, and technology in order to drive action. Programs that focus only on one aspect of this trifecta suffer, and often intranet projects are approached from a technology-only standpoint. As a result, the company's people and processes are then retrofitted to the technology, which is a backwards approach and sets up the project for failure from the onset (Smartsheet, 2021). The project team updating the Vault did not want to invest in building a tool that would not be adopted. In the early stages of the project, the working team consisted of members of an internal tools (technology) team, including a product manager, leading the design of the Vault, and members of the KM team, leading the content, migration, and organization design. Once the first attempt to engage the company in an organization-wide clean up failed, the team decided to take a step back and evaluate the makeup of the project team. The internal tools team had a deep understanding and vision for the technology, and the KM team had insights and best practices for the process (APQC, 2019).

The order of the people-process-technology trifecta is important, as the right people must be involved at the right level for the project to be successful. This includes working with executive sponsorship, cross-functional stakeholders, as well as everyday users (Harper, 2019). The team determined they were missing a strategy to activate and engage people at all levels affected by the project, and decided to integrate change management practices. At any company, no technology is adopted without the people to activate the process. By incorporating change management practices, the team created tighter feedback loops with users, and this completed the people, process, and technology trifecta.

Kotter's eight step change model (Kotter, 1995) demonstrates the project teams' PPT structure and their approach to building and implementing an updated wiki. Kotter's model includes eight key steps:

1. Creating a sense of urgency.
2. Establishing a powerful guiding coalition.
3. Defining a vision for change.
4. Communicating that vision.
5. Removing obstacles to that vision.
6. Creating short-term wins.
7. Building on the change.
8. Anchoring the change in company culture.

### Creating a Sense of Urgency

Once the PPT framework was integrated into the structure of the project team, the strategies that led to the successful rebuild and launch of the Vault began to take form. Creating a sense of urgency with employees was essential to the success of the project and began with the review and migration of content from the legacy wiki to the new wiki. The project team created this sense of urgency through communication initiatives and the creation of a network of employees, known as the Beta Vault Network, or the Network. This group of employees included the top contributors of the wiki, as frequent content creators they were inherently motivated to learn about the project and the upcoming improvements to the wiki. The goal of the project was clearly communicated to these employees and they were encouraged to share their learnings with their colleagues to promote the transformation of the wiki. Through this Network, the project team communicated the project timelines, including when content from the legacy wiki would be migrated to the new wiki. Presenting a transparent plan of when content would be migrated created a sense of urgency for network members to review their team's content and validate what should be included in the migration.

### Establishing a Guiding Coalition

In addition to the core project team that formed the PPT framework a powerful guiding coalition was also integrated into the project to provide leadership, direction, and support of the project's goals. This coalition included executives from the developer, engineering, and HR teams who provided leadership and direction for the development of the wiki and the roll out of the updated wiki. The KM team's director was an active member of this coalition and provided the foundation for the full integration of KM initiatives throughout the project and after the wiki update. The Network of employees also acted as a coalition for change. They became power users of the wiki's new features and functionality and advo-

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cated for the adoption of the tool and migrating content back into the wiki that had become fragmented across other tools.

### **Defining a Vision for Change**

The goal of the Vault project was clear from the onset because the problems with the wiki were clearly identified:

- Shopify's needs had outgrown the original wiki's features and functionalities.
- The wiki's content was disorganized and largely out-of-date.
- Shopify's employees had lost trust in the wiki and its context.

To remedy these problems, the wiki needed to go through a transformation process. The vision for the new Vault was a wiki with sufficient features and functionalities to easily contribute context, a structure to organize this context, and to regain trust in this context. Shopify was only continuing to grow, and this vision paved the road for the direction the company needed to move toward in order to continue context sharing and cement a knowledge sharing culture.

### **Communicating the Vision**

A clear communication plan was developed to ensure the right people were engaged in the project and updated at the right time. A motto often promoted by the director of KM at Shopify is “just enough, just in time, just for me”. Shopify's employees are presented with large volumes of information daily and the communication of the Vault project would be competing with this information and employees' other daily communications. Creating a communication strategy that was just enough, just in time, and just for them was critical to the adoption of the new wiki by employees. Communication began underground through the whispers of the employees involved in the Network, which included representation from every team in the organization. Leaders throughout the company were then engaged and informed about the project, the upcoming changes, and what this meant for their teams. Closer to the launch of the new tool, communications were integrated into established communication structures throughout the company and tapped into the company's culture to ensure the message resonated with employees.

### **Removing Obstacles**

One of the obstacles the project faced was the fragmentation of content across multiple platforms. Context that should have been published in the Vault had been stored in other tools that offered more features and functionality. Engaging the teams that owned this content was critical to regaining trust in the wiki and ensuring context that everyone at the company should have access to was available in the Vault. Building strong relationships with these stakeholders and understanding their pain points enabled the technology and KM project team members to build a tool and structure that could incorporate this content. Some content, due to technology restrictions, was not able to be migrated immediately to the updated wiki, however, the relationships the project team built with these content owners was strong and created an avenue for collaboration instead of a potential roadblock to the project.

## Creating Short-Term Wins

The project timeline for updating the wiki was built on launching an MVP product, the new Vault did not need to be released with every single feature on the roadmap, the wiki was not expected to be in a perfect state at launch. Instead, the MVP model allowed the project team to launch a product that had the necessary features and then functionality would be continuously developed. Expectations were set through training, communications, and open feedback loops. Employees were prepared and knew what to expect of the tool and were presented with roadmaps of future feature releases. This approach enabled the wiki to be updated quickly and helped reach the project's goal of rebuilding trust in the tool and its content instead of it continuing to degrade.

## Building on the Change

Once the new Vault was launched, the project team knew the work was not over. New features and functionality would be continuously built and rolled out, on-going training would be necessary, especially as the company was continuing to grow, content would need to be maintained to build and retain trust, and an overall maintenance plan was developed and actioned. Retrospectives were held with the project team to pinpoint lessons learned, celebrate wins, and identify how future features could be built better and more efficiently. The new wiki was launched, but the momentum of continuing to improve the tool could not be lost as maintenance of the technology and content would continue throughout the life of the Vault.

## Anchoring Change in Culture

As Kotter notes, change sticks when it becomes the “way we do things around here” (Kotter, 1995). The Vault is where executives share their context, company-wide announcements on Slack include links to more information on Vault pages, and roles from both the technology and KM team commit to continued development and maintenance of the tool. The use of the Vault is built into the way Shopify employees share their context, consume knowledge, and do their work. The continued use and promotion of the wiki is a cornerstone to the establishment of a knowledge sharing culture at the company.

## Change Management Strategy

Pernice and McGovern (2016) offer that one of the actions toward having a better intranet is to “change management culture.” The addition of change management to the project led to the creation of the group of employees called the Beta Vault Network (the Network). The Network was designed to include representation from teams across the company. Tenure, age, role type, geography, and identifying super users of the legacy Vault, were taken into account for inclusion in the Network. The intention was to have representation from almost every team so the new Vault would become the worst kept secret at the company. In Hatch's view of cultural dynamism, different groups (teams) within organizations have unique subcultures, which can influence how they interact with knowledge management tools (Hatch, 1993). While the prevailing culture of the company is demonstrated in the espoused values, teams' familiarity with technologies varies from people who use software to those who build software. Exposing a diverse group of users to the new tool ensured one team's specific tooling needs were not over indexed. There was also a fringe benefit from a diverse group of people interacting. At the workshop sessions

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there were developers sitting beside people from the legal team, which was eye opening for each group as they learned how each other's tooling needs differed.

The creation of the Network was driven by several goals. First, the original call to action to clean up the Vault's content was vague and not specific to individuals. The responsibility for the Vault's content clean up was spread out across the whole company and, as a result, became no one's responsibility. The onus needed to be put on individuals and the project team needed to be accessible to these individuals to reach out to if they had questions or feedback. Secondly, the Network would help with the development of the IA and content clean up for the migration to the new tool. These individuals were subject matter experts in their respective fields and, as the experts of their content, they were able to identify what content was relevant or out-of-date for the content migration. They were also able to identify what content belonged together in the information architecture. Lastly, the Network was provided access to the beta of the new tool, meaning it was in production, and they provided feedback on the design and features of the tool as it was being built. This provided transparency into the build process, and the project team leveraged this direct access to users by integrating a feedback form into the beta of the product and routinely asking for pointed feedback for specific parts of the new tool.

One of the keys to building trust with the Network was the team holding themselves accountable to responding to all of the feedback that was provided by the Network. This included replying to suggested features that were either not currently on the roadmap or would never be implemented, and providing a reason as to why the suggestion was not feasible or within the project's scope. However, as feasible suggestions were implemented to the beta Vault, the project team communicated these implementations to the Network to show their feedback was being actioned, when possible, which built trust with the Network. As the Network saw their feedback in-action, it made members more willing to take the time in their busy schedules to explore the tool, think critically about its design, and share more feedback.

The Network was engaged both in-person and remotely. Project team members hosted demo and training sessions at the Ottawa, Toronto, and Montréal offices. For employees located at other offices or for those who worked remotely, online workshop sessions were hosted to involve them. One of the workshops with the Network included an activity where participants were asked to re-create a preselected page of content in both the legacy Vault and in the beta Vault. This page included different types of formatting and features, including an image, text formatting, email links, links to other Vault pages, links to external sites, and a numbered list to test all features. The workshop hosts timed how long it took participants to complete this activity in the current Vault and the beta Vault. On average, it took 9.10 minutes to recreate the page in the current Vault; and in the new beta Vault, on average, it took 5.27 minutes to recreate the content. The new Vault took 4.38 minutes less to edit and recreate the content, and this was valuable feedback for the technology team and showed what they were building was faster and more intuitive for employees to use. While these metrics provided valuable feedback for the technology team building the tool, they were not measurements of employee satisfaction (Pernice & McGovern, 2016). After each workshop and demo, participants were asked to complete a survey to provide feedback on the format of the workshop and their experience using the new wiki features. This anonymous form provided the project team with tangible action items to better enhance the employee experience and the opportunity to add suggested features to the tool before it was launched to the entire company.

Through Slack, the company's primary online communication platform, the Network was given a dedicated space to ask questions and give feedback. In this Slack channel, the project team could announce new features, answer questions, and respond to feedback. Thriving on this feedback and being flexible worked well as a strategy to create a safe environment to test and experiment with the behaviour

changes the new Vault was going to create for the entire company. Gathering feedback for the demos and training done with the Network also helped to optimize the structure of these sessions. After the first working group session with the Network, feedback was provided on the format of the demos, and the project team used this feedback to reformat the following sessions, which led to greater engagement from the Network members.

Another change management strategy was to create fulsome training documentation about how to use the new wiki. Within the larger knowledge management team, the documentation (Docs) team was engaged to write training material and create instructional videos about the new features in the Vault. These training resources were then promoted during the new wikis launch to provide self-serve resources. In addition to the training material published in the new Vault, demos were made available across all of the company's global time zones for everyone to sign-up and learn the new tool. In addition to the training material and workshop, a help channel was set up in Slack. This channel included members from both the technology and KM teams to ensure both technical and knowledge management-related questions were answered. This fulsome approach of workshops, training, and a monitored channel for questions and answers, provided users with a fully supported on-boarding experience to the new Vault.

## **Information Architecture (IA) Strategy**

One of the structural additions and major behavioural changes with the new tool was applying information architecture (IA) to the content housed in the Vault. In an intranet, an IA provides a navigation structure, which improves the discoverability of content and related pages without having to rely solely on using search. The legacy Vault did not have an IA; it actually had little to no page structure.

Covert (2014) recommends that the key to choosing a good structure for the content being organized, the structure must:

1. Make sense to users.
2. Reflect the intent of why the structure is being implemented.
3. Help reach the intended goals.

The approach to the development of an IA structure met each of these guidelines to ensure that a clear and scalable architecture was designed:

1. To make sense to its users, each team that owned content in the Vault were engaged in the development of the IA. They participated in tree testing and card sorting activities throughout the build of the IA, as the design was an iterative process that relied on their feedback to refine the IA's structure.
2. The project's intent was to add clarity to the Vault's unorganized content. Employees could not connect with the knowledge they needed when they needed it, and relied on bookmarking pages because there was no structure to logically guide them to find that information again.
3. To reach the project's goal of building a resilient and scalable structure, the approach to the design of the IA was aligned with one of the company's values, which is to build for the long-term. The IA's structure was built to be scalable and stand the test of time by organizing the wikis content by topic and not by team or the organizational structure.

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To begin, a baseline IA structure was first drafted based on analyzing the content housed in the legacy Vault, and was organized by topic rather than by team. An IA that is based on teams or a company organizational chart is built on an unsteady foundation, as teams and company structures change. This approach was a shift in mind-set from the legacy Vault, where content was often presented as “about a team.” Designing the IA to be organized by topic also grouped “like” content together. In the legacy Vault, this was only achievable by coding in a sidebar; now users of the Vault could easily discover related pages in all sections of the wiki.

Next, the interactive development of the Vault's IA continued by leveraging metrics. The KM team produced a report of the top 100 viewed pages in the Vault and analyzed the results. This data revealed that HR-related content was the highest viewed. Based on this data gathering, the KM team engaged the Talent team (Shopify's HR team), as their content was both the most viewed in the Vault and is context that touches everyone at the company. The Talent team was guided through a content audit of their current pages in the Vault. They identified what content was relevant, up-to-date, and should be migrated to the new Vault and what content was no longer relevant and could be deleted. The Talent team also identified which sub-team owned each page of content, because a feature in the new Vault was page ownership. In the legacy Vault, when a page's content was out-of-date, it was difficult to know whom to contact about updating the content. With no page ownership, the last editor of the page became the de facto page owner. Often the last editor was someone who fixed a typo on the page and, therefore, could not provide further context or direction on the page's content. In the new Vault, page ownership is mandatory, and before a page can be published a team owner must be assigned and be visible on the page, along with the team's Slack channel contact. Page ownership ensures a clear understanding of which team should be maintaining the pages context and who to reach out to for questions or clarification.

After working with the Talent team, the content audit process needed further refinement before it was launched across the entire organization. This refinement process also had the benefit of introducing another team to the beta Vault to become power users and advocates of the new tool. The project team decided to engage more members of the KM team. All of the sub-teams within KM provided a representative to conduct an audit of KM's content in the Vault. These KM representatives also provided feedback on the functions and features of the new tool that the technology team could address if feasible and iterate on. Errors in the source code of the tool were also identified by both the KM representatives and the Network, which provided the developers time to fix these issues before the new tool was launched company-wide.

These KM representatives also participated in tree tests to validate the IA and identify problem areas in the structure. A tree test helps to evaluate the findability of content in an IA structure and identifies where people get lost in the content, and it reveals how your audience browses for information. For this tree test, the names of pages in the legacy Vault were provided and participants were asked where they expected to find these pages in the new navigation structure being developed. At the end of the tree test, participants were asked to provide additional feedback via a short questionnaire, which provided detailed context of the participants' experience with the IA, and helped to build the IA iteratively.

When the Beta Vault Network was established, the Network participated in these IA tree tests as well to ensure that the page structure being developed was intuitive and included the language and terms used across the company. The participants of the Network also became involved in the content audit of all of the content in the Vault. The Network collectively reviewed over 3,000 pages and identified what content needed updating, could be deleted, and would migrate to the new IA structure. Communication with the Network had to be constant in order to build and maintain a successful relationship with its members. Relationship building was critical, and required time, effort, and perseverance, but the Network's

participation was critical to the development of the IA and a successful migration of content from the legacy to new wiki. The KM team also worked closely with the technology team building the new tool to migrate the pages from the legacy wiki to the new Vault, because they also built the migration tool. This close collaboration of the KM and technology teams resulted in a successful migration. The teams worked closely together, did not work in silos, and due to this approach, the teams were able to identify areas where they could help one another. For example, the developers were able to automate updates made to the mapping spreadsheet of where content would be migrated to in the IA so that it would not be a manual process to document and update.

## **Communications Strategy**

The culture and communications teams at Shopify consider the Vault to be the tool to use to capture and share important company context with the company as a whole because it is accessible to everyone, especially as the company was internationalizing and growing in headcount. The new Vault's features would go beyond the basic wiki functionality of the legacy Vault and would be used as one of the company's main communications tools. A home page was designed to be managed by the internal communications team to create a central location to promote events and announce company-wide news and initiatives. A dedicated channel in Slack is also used to push these company-wide announcements, and these posts include links to pages in the Vault that provide more information and background about the announcement. Although the homepage is managed by the internal communications team via a form, employees can submit announcements they would like to be posted on the homepage. A monthly communications newsletter was sunset in favour of streamlining these announcements on the Vault's homepage, cutting down on the number of places employees had to look for important information.

Shopify's culture played a large role in how the tool was designed and built. As mentioned, the tool had to remain default to open to both be in line with the company's values and also to encourage employees to adopt the tool, share their knowledge, and keep the company trust battery charged. The design of the look and feel of the Vault was heavily focused on the ease of use of the tool and creating an intuitive navigation experience authentic to the culture and design principles of the company (Shopify, n.d.). The Nielson Norman Group has identified that intranets with simple and minimalist design using generous white space were among the top intranet trends and a feature of the winners of their Intranet Design Annual in 2016 (Pernice, 2016). The technology team incorporated this design approach into the product design of the wiki to give the out-dated design a modern and timeless look and feel. Whimsy was another important element of the tool. The Vault needed to feel like a continuation of Shopify's voice, and its new features should delight employees. For example, kudos can be given to colleagues through the Vault's Unicorn section. Unicorns are given as recognition for work that has gone above and beyond and demonstrate the company's values. Once a unicorn is posted, employees can then "boop" the unicorn or leave a comment as further recognition. The boop button was designed to create a delightful and fun experience; when the button is clicked, it changes colour with a confetti animation.

The project team developed a detailed communications plan for promoting the project across the company to ensure everyone was aware of the coming changes. Prior to the launch, leadership Slack channels received tailored announcements of the new tool's approaching launch, including direction on available training and resources. Each office's newsletter and major team newsletters included shout outs about the coming launch. On the day of the migration, the product manager sent an email to everyone announcing that the new Vault would be launched that evening, and the next day everyone at the company



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was introduced to the wiki with an announcement on Slack from senior leadership. This announcement included a screenshot of the original 2012 Vault launch emailed from the CEO, who built the legacy Vault, quoting Lütke's statement that, "Wikis are wonderful, if they are well maintained and used."

Through these communications, everyone at the company knew that the legacy Vault would be turned off at a set date and time and the new Vault would then be enabled and available for all employees to explore and contribute context. The training videos the Docs team had developed were key pieces of context available for self-serve learning on the new Vault. These how-to documents were also front and centre on the homepage and provided step-by-step instructions on how to create a page in the new tool, how to use the new IA and how it was developed, and a link to a roadmap of more tool features to come. Beyond a company-wide email and Slack announcement, the project team was creative with the launch of the new wiki to fit the company's culture. For the Town Hall, the week of the new Vault's release, the project team decided to introduce the Vault like an Apple product launch. Each member of the project team that was presenting at Town Hall dressed up like someone who had presented at an Apple product release, and the product manager dressed up like Steve Jobs (Apple Events, 2007). This approach created hype, buzz, and engagement around the release of the tool, which was in line with the company's culture. The goal of this approach was to have employees excited and talking about the new Vault. The Culinary team who, at the time, cooked breakfast, lunch, and snacks at each office location, were included in the plan of the wiki's launch. The team made mocktails, cupcakes, and other snacks that matched the new colour scheme of the Vault's branding. Stickers of the Vault's new logo were printed and mailed to every office location around the globe, and distributed during the Town Hall. The logo was also created as an emoji in Slack, because a central aspect of employee's communications in Slack is the emojis. The communications plan was weaved into every aspect of the Town Hall.

For the next five weeks of Town Hall, the messaging of the new Vault and where to find context at Shopify continued with vignette videos created with the Broadcast team. In these videos, scenarios of context sharing were introduced with the conclusion of the video being the tagline, "It's in the Vault." The communications plan was developed with the intention of engaging people in the right amount while avoiding the feeling that the new Vault was being pushed. Instead, by providing insight into how the tool was built and promoting the level of commitment from the project team, employees felt involved in the process, which helped to increase adoption.

## **KM Maintenance and Measuring Success**

Once the Vault was live, the maintenance and iteration phase began. The project team consciously chose to not simply build and launch the new wiki, and then walk away. The new wiki would need constant feature development and the IA and content would require regular maintenance. The legacy Vault had limited content governance or accountability, which was one of the contributing factors to its content becoming out-dated and untrusted. A maintenance plan was developed to monitor new content added to the wiki and provide IA guidance to teams. After the tool was launched, the project team continued to support and respond to all feedback and questions just as it had with the Beta Vault Network.

Including the end user from the beginning of the build of the wiki, and throughout the project, was key to the success of this project. A schedule was created for monitoring questions and feedback in a help channel in Slack, which helped to build trust in the product and the project team. As questions were asked or feedback was provided, employees received an almost immediate response, and recurring questions were integrated into help documentation. This approach created a strong feedback loop

and developed trust. A feedback button was built directly into the wiki so that errors in the source code could be easily reported and feature requests could be made. Each piece of feedback creates an issue within GitHub, where one of the technology team developers responds to and tracks the feedback, and the requester receives updates along the way. As feedback is treated like a gift at Shopify and not ignored, every piece of feedback receives a response, whether the feature can be built or not. This commitment to acknowledging feedback demonstrated to users that the project team was accountable, transparent, and committed to build a tool that would fit the needs of Shopify.

After the Vault launched, new features were continuously rolled out to continue improvement on the functionality of the existing product, and some of these new features were the direct result of feedback received. All of this built trust, as employees saw that their feedback was taken seriously and actioned, when feasible, and that the new wiki was not static, but continuing to evolve. As new features were added, the project team would announce the new feature in the help channel to promote the new functionality and keep employees informed on the tool's new functionality.

Part of the maintenance plan included KM-specific activities to maintain the IA and content added to the Vault. The KM team remained involved with the maintenance of Vault's information architecture and content since its launch. A dedicated KM resource monitors newly created pages and their placement within the IA. If content appears to have been added to an incorrect section of the structure, an outreach to the team owner of the page is conducted to provide direction on where the page would best fit within the IA. This outreach not only ensures that pages are being added to the best place in the IA, it also continues to build relationships between the KM team and teams across the organization. Pages that are created and then left blank or simply have "work in progress" or "WIP" as content, are also followed up on to ensure the page's content is updated. Outreach reminds employees that the Vault's content is being maintained, which charges the trust battery in the context that can be found in the Vault. The goal of this content maintenance is to ensure content in the Vault is up-to-date and the source of truth for its topic, so employees can have trust in the Vault and its content.

The KM team also helps teams to review and restructure their content through content audits. KM guides teams through the process of reviewing, auditing, and restructuring pages, to improve their content and structure. Card sorting activities are often conducted to test IA restructures to ensure re-organizations are intuitive to employees. Metrics are also a part of these content audits to make data-informed decisions. A common data piece to track is page views; content with low page views can be an indicator of content that is longer relevant. Analytics are consistently gathered to measure the usage of the Vault on a monthly cadence. This data provides insight on how the wiki is being adopted and used by employees. The metrics that are captured include the number of pages viewed, time spent on the page, the number of pages created and edited, the number of page views per employee, and the total time employees spend consuming content in the wiki. These metrics provide insight into the content being interacted with the most and highlight what context is important to employees. This data collection can indicate areas of the IA structure that need attention to ensure these pages are structured in the best way possible so that they are searchable and discoverable.

Gathering this data has shown that the adoption and use of the Vault has been on a steady incline since its launch. By continuing to measure the wiki usage on a monthly basis, the KM team is able to track uptake and down-take the Vault, and during the beginning of the coronavirus (COVID-19) pandemic, the analytics showed that page views were up by 60,000 in March 2020 versus February 2020. In May 2020, Shopify became a digital-by-default company; the vast majority of employees now work from home, and the analytics show a steady increase in page views since this switch to working remotely. The

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relevance of the Vault has been reinforced due to COVID-19. This demand for KM direction has increased as teams from across the company are reaching out for help with updating their pages and adding additional context to their current content on the wiki. Without office centrality, the wiki has become the one place employees engage for “source of truth” context, and this has encouraged teams to review their wiki content. In response to the increase of teams requesting help with their content, the KM team has developed self-serve content, such as teaching teams how to conduct content audits of their Vault pages.

## **FUTURE RESEARCH DIRECTIONS**

As companies adjust to shifts in the workplace due to COVID-19, the role of the wiki and intranet in a more digitally centric work environment has been highlighted. The importance of having a single source of truth for company context has become critical as organizations have either temporarily or permanently moved to a digital-first work environment. Research exploring the evolution of the intranet and its impact on remote work, both during and after the pandemic, could provide insight and guidance on the future of the intranet's role in organizational culture and knowledge management.

## **CONCLUSION**

Firmly built on the five-pillar structure of forming a cross-functional team, including change management practices, building a structured information architecture, following a communications strategy, and leveraging metrics, the rebuild and launch of the new Vault was a success. The design and implementation of the new wiki both complemented and augmented Shopify's culture and values. By incorporating Shopify's culture values into the project structure and updated wiki, the tool was embraced by employees as it fit with the accepted ways of working. The legacy Vault, through neglect, became unaligned with the espoused values while the new Vault enables employees to enact the espoused values daily.

The project had executive sponsorship, which resulted in the authority to provide resources, commitment, and the budget of updating the wiki. This influence led to the establishment of a team who could commit their time, schedule, and skills to the project. The commitment of the executive sponsorship and a formal project team demonstrated to the company this project was a priority and there would be accountability for delivering the new wiki.

The project team aligned the goals of the project with the goals of the organization and these objectives were highlighted and reinforced in the communications with the end users, Shopify's employees. The team followed an iterative build process that allowed for employees to interact with the tool while it was in beta and provide feedback. Providing access to the tool early on in the project allowed feedback to be provided throughout the build, which fostered a transparent and collaborative process in the creation of the tool's features. By collecting, processing, and enacting users' criticisms and observations, trust in the new Vault was established before the tool was even launched.

The project team being built based on the people, process, and technology trifecta ensured a fulsome approach to this project that affected everyone at the company. Change management and communications ensured that employees were engaged throughout the build of their digital workspace. Knowledge management guided employees through the process and built an IA and maintenance plan that was focused

on connecting people to context. Finally, the technology team developed a tool that was tailored to the company's culture, information, and technological needs.

The update to the Vault enabled the wiki to once again fulfil its purpose of providing a single source of truth for sharing important company context. Context sharing in the Vault establishes and maintains a knowledge sharing culture at Shopify, a place where all employees, from executives, to developers, to HR, share the context employees need when it is needed.

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## KEY TERMS AND DEFINITIONS

**Change Management:** A structured approach to transitioning and adjusting people to desired future states.

**Company Culture:** The environment a company creates based on a set of beliefs and behaviours that establishes how its employees interact, share, learn, and grow.

**Context Sharing:** The ability to explain the “why” and “what,” and share this information openly to enable interactive collaboration and problem solving.

**Digital Transformation:** The adoption of digital technologies to replace manual or non-digital processes.

**Enacted Values:** The values demonstrated by an organization member’s decisions and choices. Values in practice.

**Espoused Values:** The values codified and promoted by the organization. An example would be a company’s mission statement or vision. Values in theory.

**Information Architecture:** An organized governing navigational structure that makes information findable, manageable, and useful.

**Intranet:** An online platform internal to a company that allows for internal communication, knowledge sharing, and collaboration.

**Metrics:** Sets of data that enable information to be measured and tracked.

**Minimum Viable Product (MVP):** Is a version of a product with enough features for the product to be used with the intention of feedback being provided by early adopters for future iterative development.

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