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Knowledge Management Practices in the Public Sector

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Vasileios Ismyrlis, Theodore Tarnanidis,
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Knowledge Management Practices in the Public Sector

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Table of Contents

Preface	xiii
----------------------	------

Chapter 1

Knowledge Mobilization and Global Higher Education: Building Capacity for Change.....	1
------------------------------------------------------------------------------------------	---

Christopher J. Garretson, Columbus State University, USA

Pamela A. Lemoine, Troy University, USA

Robert E. Waller, Columbus State University, USA

Michael D. Richardson, Columbus State University, USA

Chapter 2

A Mapping of Knowledge Management Techniques and Tools for Sustainable Growth in the Public Sector.....	24
------------------------------------------------------------------------------------------------------------	----

*Loukas Tsironis, Department of Business Administration, University of
Macedonia, Greece*

Theodore Tarnanidis, University of Macedonia, Greece

Chapter 3

Risk Assessment: Knowledge Management Paradigms, Big Data, and Aviation Policy Making.....	47
-----------------------------------------------------------------------------------------------	----

*Maria Papanikou, Amsterdam University of Applied Sciences, The
Netherlands*

Chapter 4

Communication Barriers and Social Capital: Improving Information and Knowledge Flows in Public Services.....	76
-----------------------------------------------------------------------------------------------------------------	----

Effimia Katsanika, University of Macedonia, Greece

Katerina Gotzamani, University of Macedonia, Greece

Chapter 5

The Role of Middle Managers in Knowledge Creation and Diffusion: An Examination in Greek Organizations 105

Loukas K. Tsironis, University of Macedonia, Greece

Vasileios Ismyrlis, Hellenic Statistical Authority, Greece

Chapter 6

Using Action Research for Improvement of Project Knowledge Management in the Public Museum 123

Kamila Brodzińska, Jagiellonian University, Poland

Agnieszka Szostak, Jagiellonian University, Poland

Beata Jatocha, Jagiellonian University, Poland

Chapter 7

Understanding the Dynamics of Knowledge Management Tools in Two Public Universities in Delhi, India 145

Vikas Gupta, Delhi Technological University, India

Chapter 8

Practices and Challenges of Knowledge Management in the Greek Public Sector 178

Vasileios Ismyrlis, Hellenic Statistical Authority, Greece

Chapter 9

Implementing a Knowledge Management-Based Model for Lessons Learned . 196

Moria Levy, ROM Knowledgeware, Israel

Rinat Salem, Hebrew University, Israel

Compilation of References 220

About the Contributors 257

Index..... 262

Detailed Table of Contents

Preface	xiii
----------------------	------

Chapter 1

Knowledge Mobilization and Global Higher Education: Building Capacity for Change.....	1
------------------------------------------------------------------------------------------	---

Christopher J. Garretson, Columbus State University, USA

Pamela A. Lemoine, Troy University, USA

Robert E. Waller, Columbus State University, USA

Michael D. Richardson, Columbus State University, USA

Two major world changes have changed global higher education; the move from a content-based economy to a knowledge-based economy and globalization have led global higher education to critically examine its position in the new hierarchy. Global higher education is using knowledge mobilization to as a means to build capacity for the changing environment. There is a call for global universities to engage in the generation of knowledge related to pressing global issues and knowledge mobilization has proven to be a reliable tool to connect the university with society.

Chapter 2

A Mapping of Knowledge Management Techniques and Tools for Sustainable Growth in the Public Sector.....	24
------------------------------------------------------------------------------------------------------------	----

*Loukas Tsironis, Department of Business Administration, University of
Macedonia, Greece*

Theodore Tarnanidis, University of Macedonia, Greece

This chapter seeks to determine the criteria that lead to the excellence of knowledge management in the public sector. The authors discuss issues of what exactly knowledge means and how knowledge management is defined, how an organization will capture, preserve, and diffuse knowledge, and why knowledge management is ultimately important for predictable future developments. Knowledge management is considered a prerequisite for achieving innovation and competitiveness both within and outside the organization as it promotes the consolidation of an organization

in the long term with a clear focus on strategic importance. Likewise, knowledge management programs can be applied to different areas of an organization in the public sector. However, it should be mentioned that the difficulties that arise in their implementation are many, as various concerns arise, which are directly related to the equal mappings of knowledge and its measurement.

Chapter 3

Risk Assessment: Knowledge Management Paradigms, Big Data, and Aviation Policy Making47

Maria Papanikou, Amsterdam University of Applied Sciences, The Netherlands

The chapter analyses knowledge management paradigms for the understanding and prioritisation of risks (risk assessment), leading to decision making amongst policymakers. Studies and approaches on knowledge-based risk assessment and, in general, risk management vary depending on perceptions of risk, and these perceptions affect the knowledge scope and, ultimately, affect decisions on policy. Departing from the problems of big data in aviation, the shortcomings of the existing knowledge management paradigms and the problems of data conversion to knowledge in aviation risk management approaches are discussed. The chapter argues that there is a need for transdisciplinarity and interdisciplinarity for greater understanding of context deriving from the challenges in the big data era and in aviation policymaking. In order to address the challenging dynamic context in aviation, the chapter proposes a strength/knowledge-based inquiry that involves public sector and high-power organisations in order to gain holistic knowledge and to aid the decision analysis of policymakers.

Chapter 4

Communication Barriers and Social Capital: Improving Information and Knowledge Flows in Public Services.....76

Effimia Katsanika, University of Macedonia, Greece
Katerina Gotzamani, University of Macedonia, Greece

The aim of this chapter is to explore ways in which the flows of information and knowledge within public services are affected by social capital. Drawing on communication and social capital theory and making use of network analysis tools, a regional department of a Greek social security entity served as a case study to assess the contribution of social capital to overcoming barriers to effective communication among public sector employees. Structural, relational, and cognitive social capital at a personal level were found to alleviate problems of accessibility as well as problems related to the control of the flow of information by gatekeepers, arbitrarily abridging, or distorting messages. Building new communication channels through personal initiative, establishing and maintaining good relationships among

employees, and developing shared perceptions about communication and information sharing are facets of social capital that seem to ensure a more effective knowledge and information flow.

Chapter 5

The Role of Middle Managers in Knowledge Creation and Diffusion: An Examination in Greek Organizations 105

Loukas K. Tsironis, University of Macedonia, Greece

Vasileios Ismyrlis, Hellenic Statistical Authority, Greece

The role of middle managers in modern management theory has been already recognized, and this role is considered very important for the functioning of an organization. They have managed to be involved in many aspects of managing, and one of them is the novice field of knowledge management. In this chapter, the role of middle managers in knowledge creation and diffusion is explored and analyzed. A theoretical model of four middle managers' roles affecting the strategy of an organization is examined. The model was tested through a questionnaire in a sample of 241 middle managers of Greek organizations. After the analysis of the data collected, it was deduced that the theoretical model utilized was validated in the sample.

Chapter 6

Using Action Research for Improvement of Project Knowledge Management in the Public Museum 123

Kamila Brodzińska, Jagiellonian University, Poland

Agnieszka Szostak, Jagiellonian University, Poland

Beata Jałocha, Jagiellonian University, Poland

This chapter aims at presenting the results of the research carried out as part of the action research project concerning knowledge management and knowledge sharing in a public institution. As a research subject, a public cultural institution in Poland was selected. The methods used during the implementation of the research include observations, interviews, questionnaire surveys, and document analysis. The chapter presents the course of the research process, a diagnosis of problems, and challenges of the institution under study as regards project knowledge management, analysis of results, and recommendations. The principal result of the study is the developed action plan that contains an overview description of the proposed change and suggestions for solutions for the diagnosed challenge. It also illustrated that action research is a research approach supporting project management processes in public organizations. The theoretical background for considerations undertaken in the work are the concepts of project knowledge management and sharing knowledge on the implemented projects.

Chapter 7

Understanding the Dynamics of Knowledge Management Tools in Two
Public Universities in Delhi, India 145

Vikas Gupta, Delhi Technological University, India

The chapter aims to explore the dynamics of knowledge management (KM) in terms of information and communication technologies (ICT) and KM tools in higher education institutions (HEIs). The various KM and ICT tools and their applicability are discussed in detail in two public universities in Delhi, India. The chapter is the result of the literature review pertaining to the changing educational ecosystem. A comprehensive review of peer-reviewed journal articles, books, and research papers has been carried out in the area of KM, ICT tools, and education. Forty-six KM tools extracted from four KM toolkits, and 12 ICT tools were tested. A survey with the 542 students, 112 faculty, and 48 administrators was conducted (separate for each category). The findings reveal that some of the ICT and KM tools have a significant presence in universities. These tools have not only enhanced knowledge sharing but also intensified the learning experience of the users.

Chapter 8

Practices and Challenges of Knowledge Management in the Greek Public
Sector 178

Vasileios Ismyrlis, Hellenic Statistical Authority, Greece

Knowledge management (KM) is a highly appreciated initiative in the field of management, and though it was initiated from the private sector, in the last years there has been an extensive interest and concern in the public sector. KM seems to be an excellent solution in order to manage the information and knowledge inside the organizations by saving valuable resources. In this research, many studies concerning the implementation of different KM practices in Greek organizations were examined. From the studies analyzed, it was concluded that the employees of the Greek public organizations have embraced all the activities concerning KM practices. However, many problems typical of the Greek public sector were present such as the absence of a reward system for knowledge transfer, the functioning of the public sector employees in an individualistic way, and the delay in adopting information and communication technology (ICT) practices and in the promotion of e-government.

Chapter 9

Implementing a Knowledge Management-Based Model for Lessons Learned . 196

Moria Levy, ROM Knowledgeware, Israel

Rinat Salem, Hebrew University, Israel

Lesson learning is a well-known and crucial organizational tool that serves many organizations wishing to improve their performance. This chapter describes a knowledge management (KM)-based model, improving the level of learning and of the lessons learned with the goal of reducing repeated mistakes as well as recreating their successes. The key features of the model were the base of a research conducted using a case study approach implemented at the Welfare Division of the Jerusalem Municipality’s Community Services Administration. The implemented model, based on KM ideas, added two significant stages to the process of debriefing—refining the lessons learned and transforming them into lessons that are managed in an independent database—as well as an additional stage, which was comprised of active processes of integrating the lessons into the organizational work.

Compilation of References	220
About the Contributors	257
Index.....	262

Preface

Knowledge Management (KM) is a management concept that initialized in order to acquire and manage a significant asset, circulating inside the organizations, called knowledge. The use of knowledge is already recognized as a valuable asset in management theory, and in the modern information domain, as it could be decisive for the organization's sustainability. With the additional contribution of Information Technology (IT) in these efforts, the private sector seemed to have benefited from the exploitation of knowledge, for many years. Later, the need to adopt these processes in the public sector as well, was inevitable. Public sector presents issues (like bureaucracy and other structural problems) that make KM's implementation essential and capable to solve many problems. However, the public sector provides services to the public and it does not expect to acquire financial gain, hence the practices from the private sector could not be used efficiently without modification adjustment, having also in mind that the main scope of the public organizations is to provide quality services to the citizens. KM can acquire and transfer knowledge in order to succeed in this effort and to confront challenges that exist in the modern knowledge economy. Therefore, KM can play a vital role in the reorganization of the public sector and the necessary organizational change.

The concern for the exploitation of KM in the public sector has arisen mostly in the last years. The major issue is to find the appropriate solutions for each organization, as some of them function in different environments (i.e. local, state and international). KM is a field in which many studies have been conducted, yet it seems that the subject needs to be further investigated.

THE EVOLUTION OF KNOWLEDGE AND KM IN THE PUBLIC SECTOR

Knowledge is a set of information arising from the experiences and ideas of the employees and of course before it has taken its final form, it is also influenced by the skills and background of each person. Knowledge can be observed in two forms: the

tangible one and the intangible. The tangible one can be easily registered, codified and transferred, while the intangible, must be first explored and translated, in order to be usable and therefore it presents some difficulties in possessing it.

From the above mentioned it can be deduced that knowledge is considered a valuable intangible resource, which can be decisive for the sustainability of the organizations. One of the management gurus, Drucker (1995) pointed out that knowledge is an important economic resource in an organization.

KM is an initiative that managed to enter into the management field in the last decades. Nonaka and Takeuchi (1995) have formed the principles and perspectives of business knowledge and signaled the beginning of exploiting knowledge in the organizational level. First of all, they defined KM as an activity, which includes the abilities and experiences of the organizations' members, the innovation and creativity potential, the optimal business practices, the patents, the knowledge that the organizations have accumulated for the market and its customers, as well the knowledge for its competitors. They also highlighted that business knowledge is not only the total of its members' knowledge, but the modern business environment demands the full exploitation of the collective business knowledge of a company. Lastly, they reported that the creation of organizational knowledge is the ability of an organization as an entity, to create new knowledge and to disseminate it inside the organization and to integrate it into products, services, and systems.

The extended spreading of information in the last decade of the 20th century and at the beginning of the 21st has made the world a very small place. The evolution in communication technologies and internet (world wide web) have entered into every aspect of human activities. As the world had become and still has, smaller and easily accessible from many people, information and knowledge are expanding at an even bigger pace. Knowledge is now globally accepted as a driving force of economic development and a powerful factor of social relationships' configuration (Geisler, 2008). Many private and public organizations are now eligible, due to this technological evolution, to codify, store and process enormous quantities of information and data, originated from the registration of their internal processes, as from the observation and study of their external (direct and not) environment. Drucker (1993) have precluded the arrival of a new economy and society, calling it "knowledge society" (herald the arrival of a new economy or society, referred as "Knowledge society").

KM was originated and used in the private sector and its essence has attracted attention in various areas of business capacity. However, in the last years its utilization is considered essential for the public sector as well. Many of its aspects are yet to be explored and especially public sector can be benefited additionally from its implementation. From the private to the public sectors, KM is being considered as a key element that add value either to the profit maximization of companies or

Preface

to service delivery in public sector economies all over the world. KM is usually considered as a key initiative in the process of information sharing and access between public sector agencies and between the public sector and the citizens they serve. It can create mechanisms that discover, process, exploit and distribute knowledge of each individual employee in order to improve their productivity.

However, as already mentioned, the public sector has many particularities, that can also differ from country to country. Public sector includes all kinds of agencies and organizations at any level (national, regional or local) of government. These organizations are usually non-profit ones and they provide many different forms of public services to the citizens. Information that circulates in local, regional or national level is an important asset in the process of providing services to citizens, if resources are efficiently managed. This information needs to be managed adequately so that service delivery becomes more efficient. Public organizations have also many particular characteristics, like bureaucracy, inefficient management practices, fragmented structures, etc. The solution of these problems can lead to the provision of better services to the citizens and consequently, it can improve the social and economic development of the nations. KM process (as knowledge creation and sensing, knowledge organizing and capturing, knowledge sharing and dissemination) could provide valuable solutions to all the above problems.

CHALLENGES, TRENDS OF KM IN PUBLIC SECTOR

As Arora (2011) presented, many tendencies have affected the actions of public organizations and led them to the exploitation of knowledge. These tendencies include the globalization of economies and societies, the usage of market methods from public organizations, the continuous and rapid changes in technology and science, the urgent need to secure peoples' well-being, the deficiency in public resources.

At the same time, the implementation of KM in the public sector must confront some serious challenges (OECD, 2003). First of all, citizens are now more demanding, since as the clients they receive also services from the private sector and they can make comparisons. Another issue is that the human resources in the public sector have reduced in the last years, and generally the function of Human Resources Management (HRM) is not effective.

The public sector serves an important role, as a factor to retain and improve the economy and citizens' quality of life. These reasons have triggered the interest of public sector organizations in knowledge. More specifically KM can deal with **some** important problems of public management (Theocharis & Tsihrintzis, 2016) as the following:

- When there is a need for specific expertise or skill and none of the existing staff seems to have the appropriate knowledge.
- When a solution to a problem requires some experience, but the person who acquires this experience is missing.
- When the matching of a person's abilities and the job, does not work efficiently while optimal matching between position and specific, objective abilities.
- When an organization decides to apply the policies of staff training, but training needs, which reflect specific knowledge gaps, are not known and have not been documented.
- When there is knowledge to certain individuals, however, either is not used or not effectively diffused inside the organization for a variety of reasons.

Public sector managers and administrations face many challenges and new responsibilities in the twenty-first century. Just a few of the more salient of these challenges are defending the homeland against terrorist actions, preventing the spread of infectious disease, maintain a reliable stream of social security income, continuing to support the transition from welfare to work, ensuring that education systems meet the needs of students both young and old, and repairing an aging and in many cases decaying physical infrastructure (U.S. GAO, 2004).

Among the key trends impacting the way government must act today and in the future are (McNabb, 2007):

- The globalization of society that will continue to increase the interdependence of business and industries, national and regional economies, markets for products and services, civil societies, and national governments.
- The shift to market –oriented, knowledge-based public services, and the continued pressures for privatization of government services.
- Continued rapid advances in science and technology-and the blending of the two, as in
- Biotechnology and the opportunities and challenges these advances represent-including the potential for adverse public reaction to such advances.
- The many challenges and opportunities facing governments in maintaining and improving the quality of life for their citizens, families, communities, and nations in general, including gaining control of rising health care costs.
- The challenges government managers and administrators face with the changing and increasingly diverse nature of government structures (such as collaborations across jurisdictions) and tools, including e-government.
- A continuing demand that governments do more with less, and for greater accountability for the actions of government. This global trend is driving a movement for improving the performance of governments. This movement

Preface

goes by many names, such as “reinventing government” and “management transformation”. A primary feature of the movement is public- and private-sector partnerships.

OBJECTIVE OF THE BOOK

The main objective of this book is to register the interest and the actions taken from the public organizations in their attempts to manage knowledge. Public organizations have a major interest in this subject, especially in the last years, as they wish to improve the quality of their services, solving many of the problems that prevent them. However, it seems that the study of KM in the public sector is still in its infancy. KM, although initiated from the private sector, has the capability to have an impact on the public part of the economy, too. Hence, this book will aim to concentrate and present paradigms of KM implementation in public organizations, including many fields as KM assessment, KM tools and practices, the role of Human resources, the role of ICT, Decision analysis techniques public decision-making, social aspects of KM, services transformation and many more. The presentation of the research in these fields will contribute to realizing the differences between countries and organizations and should stimulate the interest of many other scholars, and of course, of public policy makers, in order to take actions to improve their current KM level.

ORGANIZATION OF THE BOOK

The book is organized into nine chapters. A brief description of each of the chapters follows:

Chapter 1 presents the usage of knowledge mobilization in Global higher education as a means to build capacity of the changing environment. Global universities seem to engage in the generation of knowledge related to pressing global issues and knowledge mobilization has proven to be a reliable tool to connect the university with society.

Chapter 2 seeks to determine the criteria that lead to the excellence of Knowledge Management in the public sector. It concludes that the difficulties that arise in their implementation are many, as various concerns arise, which are directly related to the equal mappings of knowledge and its measurement.

Chapter 3 analyses knowledge management paradigms for the understanding and prioritization of risks (risk assessment), leading to decision- making amongst policy makers. Author argues that there is a need for transdisciplinarity and interdisciplinarity for greater understanding of the context, deriving from the challenges in the big

data era the aviation policy making making. Finally, the chapter proposes a strength/knowledge-based inquiry that involves public sector and high-power organizations.

Chapter 4 aims at exploring ways in which the flows of information and knowledge within public services are affected by social capital. Drawing on communication and social capital theory and making use of network analysis tools, a regional department of a Greek social security entity served as a case study to assess the contribution of social capital to overcoming barriers to effective communication among public sector employees.

Chapter 5 explores and analyses the role of middle managers in knowledge creation and diffusion. A theoretical model of four middle managers' roles affecting the strategy of an organization is examined. The model was tested through a questionnaire in a sample of two hundred and forty-one middle managers of Greek organizations.

Chapter 6 aims at presenting the results of the research carried out as part of the Action Research project concerning knowledge management and knowledge sharing in a public institution. The chapter presents the course of the research process, a diagnosis of problems and challenges of the institution under study as regards project knowledge management, analysis of results, and recommendations.

Chapter 7 aims to explore the dynamics of Knowledge Management (KM) in terms of Information and Communication Technologies (ICT) and KM tools in Higher Education Institutions (HEIs). The various KM and ICT tools and their applicability are discussed in detail in Two Public Universities in Delhi, India. The findings reveal that some of the ICT and KM tools have a significant presence in universities. These tools have not only enhanced knowledge sharing, but also intensified the learning experience of the users.

Chapter 8 examines many studies concerning the implementation of different KM practices in Greek organizations. From the studies analyzed, it was concluded that the employees of the Greek public organizations have embraced all the activities concerning KM practices. However, many problems typical of the Greek public sector, were present.

Chapter 9 describes a Knowledge Management (KM) based model, improving the level of learning and of the lessons learned, with the goal of reducing repeated mistakes, as well as recreating their successes. The implemented model, based on KM ideas added two significant stages to the process of debriefing: refining the lessons learned and transforming them into lessons that are managed in an independent database; as well as an additional stage, which was comprised of active processes of integrating the lessons into the organizational work.

REFERENCES

- Arora, E. (2011). Knowledge Management In Public Sector. *Journal of Arts Science and Commerce*, 2(1), 165–171.
- Drucker, P. (1993). *Post-capitalist society*. Oxford: Butterworth Heinemann.
- Drucker, P. (1995). *Managing in a time of Great Change*. Truman Talley/E.P. Dutton.
- Geisler, E. (2008). *Knowledge and knowledge systems*. Hershey, PA: IGI Publishing. doi:10.4018/978-1-59904-918-2
- McNabb, D. E. (2007). *Knowledge management in the public sector: A blueprint for innovation in government*. Armonk, NY: Sharpe.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.
- OECD. (2003). *Conclusions from the results of the survey of Knowledge Management Practices for Ministries/Departments/Agencies of Central Government in OECD Member Countries*. OECD.
- Theocharis, S. A., & Tsihrintzis, G. A. (2016). Knowledge Management Systems in the Public Sector: Critical Issues. *Lecture Notes on Software Engineering*, 4(1), 59–65. doi:10.7763/LNSE.2016.V4.224
- U.S. GAO (General accountability office). (2004). *Best Practices: Using a Knowledge-Based Approach to Improve Weapon Acquisition*. GAO-04-386SP. Washington, DC: Author.

Chapter 1

Knowledge Mobilization and Global Higher Education: Building Capacity for Change

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ABSTRACT

Two major world changes have changed global higher education; the move from a content-based economy to a knowledge-based economy and globalization have led global higher education to critically examine its position in the new hierarchy. Global higher education is using knowledge mobilization to as a means to build capacity for the changing environment. There is a call for global universities to engage in the generation of knowledge related to pressing global issues and knowledge mobilization has proven to be a reliable tool to connect the university with society.

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INTRODUCTION

Globalization and internationalization of the university creates an unrivaled invitation for learners, scholars, and researchers to connect their shared creativity, knowledge and experiences (Bejinaru & Prelipcean, 2017). Current demands, particularly related to knowledge creation and dissemination, create pressure for economic growth and socioeconomic development at country and regional levels (Mense, Lemoine, Garretson, & Richardson, 2018). In the global sphere, there is a call for universities to engage in the generation of knowledge related to pressing global issues (Wells, 2017).

The world, in general, and societies in particular, are confronted with the process of continual change and have evolved and turned very fast in the last decades into a globalized arena (Bourn, 2018). Universities are going through one of the most dramatic periods of transformation because globalization involves the fortuitous prospects to take advantage of significant opportunities (Altbach, Reisberg, & Rumbley, 2019). However, globalization also brings challenges or even threats to the future. Some have concluded that the role, the mission, the impact and the expectations from the universities are heightened as never before (Pucciarelli & Kaplan, 2016; Wadhwa, 2016).

The changing role of universities is reflected in the re-orientation and (changing) purpose of research (Caulfield & Ogbogu, 2015). There has been an adoption of principles of responsible research and innovation (RRI) by the European Union that seeks to strengthen community research partnership approaches, structures, and methods. This is both a response to and a driver of change in the research process and practices towards more comprehensive models of innovation through use of knowledge mobilization (Grau, 2017).

Changing Focus of Global Higher Education

Global higher education institutions are expected to be engrossed in the development of society by using research and knowledge transfer and should develop their capacity for knowledge productivity and sharing (Bratianu, 2015). Relatedly, many other dynamics converge to generate high levels of distress in the field of educational research due to the increasing and not merely shifting types of demands on faculty, particularly in relation to research (Cuthill, O'Shea, Wilson, & Viljoen, 2014). Alongside these demands for research are the ensuing debates about how best to assess the range of scholarship produced by faculty playing a pivotal role in the evolution of a research focused landscape (Fullwood & Rowley, 2013). In addition, there are profound social, cultural, technological, scientific and environmental changes which occur at most local but also at global levels of the modern world (Kenny, 2017). Also,

new skills may be relevant for the world of tomorrow through interaction with other organizations and agencies. Researchers and universities should be experts in research design and accountability that can accentuate knowledge exchange or mobilization (Landri, 2012). In addition, knowledge exchange systems are not restricted to formal communication channels but extend well beyond organizational boundaries.

The global challenges that universities are expected to face during the next five to ten years are alarming due to decreased revenue and changing enrollments. Global universities are expected to become more engaged in their communities and regions, while at the same time they are responding to global competition (Lemoine, Hackett, & Richardson, 2016). In order to accomplish their mission global higher education institutions are expected to give their best to the world while finding means for transforming their product, knowledge, into recognized results than can assist society (Strier, 2014).

Governments, universities, businesses and the general public recognize both the special capability and responsibility of global higher education institutions to make larger contributions (Lane, Lemoine, Tinney, & Richardson, 2014). In this respect, entrepreneurship and engagement with external parties have advanced to key enablers and drivers of this transition (Driscoll & Sandmann, 2016). While the concept of an engaged and entrepreneurial university is certainly not new, today's changing environment finally creates the demand to further explore the concepts and practically implement them on a larger scale (Ropke, 2006).

Universities worldwide are placing significantly higher emphasis on their external relationships and the development of their intellectual resources (Giles, 2016). Transforming the higher education system and especially, transforming universities that are not very dynamic by nature, however, is a major and difficult undertaking (Cai, 2017). The growing international interest in knowledge management and mobilization is motivated in part by the growing appreciation of the importance research has for enhancing the quality of public services such as higher education (Barley, Treem, & Kuhn, 2018). In the absence of proven frameworks, good practice examples, tools, and methods, university excellence requires experimentation and the development and utilization of new means for achieving knowledge management and mobilization (Chen, Yuan, Wu, & Dai, 2017; Cioffi, Dalessio, & Gomez-Paloma, 2016).

Functions of the Global University

Universities have traditionally had two main roles: creating knowledge and disseminating knowledge. Research has been the main vehicle for creating knowledge and teaching has been the one for disseminating knowledge. In today's rapidly changing economic environment, the traditional role of universities as providers of knowledge is greatly challenged. Universities spend a great deal of time generating research

knowledge that could be of use to practitioners and decision makers. However, the research knowledge often does not reach these potential users (Broekkamp & van Hout-Wolters, 2007). Research outputs must take numerous forms to have the most impact by reaching a larger audience in the higher education sector (Cooper, 2017). Researchers should use clear, simple and jargon-free writing, as well as provide a sufficient and detailed analysis of specific interventions or knowledge that allows practitioners to connect with the material and test it out themselves. For research to effectively meet user needs, the target audience needs to be clearly identified.

In knowledge mobilization there is a correlation between the new understanding of the knowledge concept and the functioning of the university. Knowledge represents a strategic resource for universities and also the main resource used in all its organizational processes and has great impact on the final products and services that the university delivers for its stakeholders and finally for the whole society (Lightowler, Stocks-Rankin, & Wilkinson, 2018). The importance of the ability to generate new knowledge suggests a different view on the “boundaries” of the university. To be used effectively, knowledge mobilization creates linkages and exchanges between producers and users of data, information and knowledge to promote and engage in value-added activities (Cooper, Rodway, & Reid, 2018).

Due to its evolutionary nature, higher education has largely led the research domain (Harkavy & Hartley, 2012). Thus, the university has a very well-determined role to deliver research that will actively support industry and society’s interests (Feuer, 2016). To continue with the argumentation of the triad, the university holds the responsibility to partake in the creation of business and society’s future (Etkowitz, 2008). Consequently, the university should partake as a key stakeholder in the development of the arenas for research and innovation (Rowell, 2017).

Knowledge-Based Economy

The knowledge-based economy focuses on production, diffusion, and use of technology and information as critical to economic activity and sustainable growth. Therefore, effective dissemination strategies for research are essential for evidenced-based practices (Rickinson, de Bruin, Walsh, & Hall, 2017). The knowledge-based economy has opened many market opportunities and universities have been quick in recognizing prospects for growth and influence. This knowledge economy forces global higher education to focus on specialized knowledge that is no longer simply shared free of charge but turned into a profit opportunity (Morgan, 2014). The global higher education transformation follows a specific path: the researcher becomes an ‘entrepreneur’, knowledge becomes a ‘product’, and the student becomes a ‘customer’ (Vila, 2019).

To express it more specifically, knowledge becomes a strategic resource (Naidorf, 2014), and knowledge creation an essential function of global higher education. Since all main functions of a university are related to knowledge creation, knowledge transfer, knowledge transformation, and knowledge distribution, the university becomes a knowledge-intensive organization dominated by intellectual capital over any other form of physical capital (Bejinaru, 2016). As a knowledge intensive organization, the global university must carefully manage critical issues like knowledge creation, knowledge acquisition, knowledge transfer, knowledge conversion and also knowledge loss (Ozdemir, 2018). All these processes must be efficiently administered as they contribute directly to the increase or decrease of the competitive advantage for the global higher education institution (Al-Kurdi, El-Haddadeh, & Eldabi, 2018).

In the knowledge society, knowledge becomes the strategic resource and global universities have a significant role in generating, processing and transferring knowledge to society (Levin & Qi, 2013). Global universities also have a vital and growing role in supporting innovation and facilitating economic development through the addition of knowledge transfer activities to the core missions of teaching and academic development (Schulze-Cleven & Olson, 2017).

What is Knowledge Mobilization?

Knowledge Mobilization (KMb) refers to the multiple ways in which stronger connections may be made between research, policy and practice and should permeate global higher education (Fenwick & Farrell, 2012). While there are multiple definitions of knowledge mobilization, each reflects an expressed goal of ensuring that research will be impactful and that it will make a difference (Jones, Procter, & Younie, 2015). For global higher education knowledge mobilization describes the process of moving knowledge into situations where it can be put to use outside the university (Kaweesi, 2018). The value of KMb is its ability to better explain the link between global universities and the needs of society. In other words, it is what is in-between the knowledge and the “doing” (Levin, 2013). Integral to knowledge mobilization is the conceptualization that research can and should ignite change or action (Nichols, Gaetz, & Phipps, 2015).

KMb occurs through social processes involving interaction among groups to improve the broader higher education system. Knowledge mobilization processes involve collaboration between university researchers and those outside the university to improve society, i.e., the mobilization of knowledge from researchers to practitioners (Orr & Jung, 2016). Expansion of research findings beyond the scholarly community is an important and growing focus of concern for global higher education institutions (Phipps, Cummings, Pepler, Craig, & Cardinal, 2016). The growing interest in this

work around the world is motivated in part by the call for greater accountability in research investments (Edwards, 2017).

Current efforts to improve connections between research, policy and practice are gaining prominence, but practitioners and researchers are still asking questions about how these connections can be improved, particularly in global higher education (Edelstein, 2016). In general, the primary aim of KMb is to motivate society to become users of research to enable positive change (Ion, Marin, & Proteasa, 2019).

Knowledge Mobilization Strategies

Knowledge mobilization strategies provide a framework to implement research methods, communication processes and outcomes that are high in impact and relevant to society (Silova, Read, Mundy, & Epstein, 2016). They also involve communication strategies that mobilize knowledge beyond those directly involved in the research process (Cooper, Rodway, & Read, 2018).

Knowledge mobilization is a crucial component of global higher education for researchers to engage in research and to distribute and share research that adds value to the research and to society (Rowell & Hong, 2017). KMb has relevance for *all* forms of research and requires researchers to consider both impact and results. A knowledge mobilization strategy describes the ties between actual research results and how the results can be used to address real world issues (Read, Cooper, Edelstein, Shon, & Levin, 2013).

Dissemination

Klein and Gwaltney (1991) described four types of dissemination: spread, choice, exchange, and implementation. The first type—spread—is a “one-way diffusion or distribution of information” (p. 246). In this type of dissemination, knowledge producers share and promote the use of knowledge among target audiences. Compared to the first, the second type—choice—is more reactive and responsive because it “helps users seek and acquire alternative sources of information and learn about their options” (p. 246). This type of dissemination is usually carried out by clearinghouses, libraries, data bases, and information centers. The third type of dissemination is called exchange, which “involves interactions between people and the multidirectional flow of information through such media as conferences, forums, computer networks, feedback systems, and so on” (p. 246). The fourth and final type of dissemination is implementation, “which includes technical assistance, training, or interpersonal activities designed to increase the use of knowledge” (p.247). Knowledge mobilization clearly matches the description for the fourth type of dissemination, implementation,

University Partnerships

Higher education-partnerships, such as student internships and the involvement of community organizations, often promote quality, relevance, skills' enrichment and socio-economic development (Bowers, 2017). Therefore, formal association with global higher education institutions is an important means for disseminating and sharing research through KMb (Yuan, Li, Vlas, & Peng, 2018).

Another model of partnership is academic–industry collaborations (Cherney, 2015). Previous applications of this approach have shown that academic–industry collaborations can improve the policy uptake of academic research (Cooper, 2014). The benefits of academic–industry collaboration can be uncertain as organizational capacities, cultural barriers and incentives all influence the outcomes sought by each party (Chan & Farrington, 2018). It may be necessary to “translate” research findings in order to make them accessible and relevant to the intended audience, a process that requires skill and know-how (Hsin-Chieh & Chi-Fang, 2018).

Another model that is not so clearly understood, capacity building, is linked to the liberation of consciousness and the possibility of not only individual action, but collective mobilization to advocate community or social change both domestically and globally (Mosher, Anucha, Appiah, & Levesque, 2014). From the institutional perspective, it is increasingly clear that knowledge transfer, both within and outside of groups, plays a fundamental role in the effectiveness of organizations (D'Este, Ramos-Vielba, Woolley & Amara, 2018).

Global higher education institutions are increasingly investing in community-university partnerships to strengthen relationships with the local community, expanding opportunities for students, and supporting faculty in community engaged scholarship (Hall, Jackson, & Tandon, 2016; Phipps, Johnny, & Wedlock, 2015). Creating an environment of shared learning in which all participants are open to new ideas, experience, and knowledge requires respect for diversity, explicit attention to how power is shared, and strong communication practices (Middleton & Whitmore, 2017). Values of participation, democratic inquiry, reciprocity, and empowerment are integral to the creation of shared opportunities for university partnerships (Cain, 2019). However, it cannot be assumed that simply communicating research findings will have an impact or generate change (Michels, 2018).

Engagement

Global higher education is experiencing a crisis in public perception related to productivity and cost. Institutions founded on the principle of education for public good are facing questions about whether they are living up to this promise or becoming entrepreneurial organizations that care more about themselves than those

they were designed to serve. There is a strong and growing impetus for universities and colleges to ensure that their presence within various communities is productive and transformative (Hall, Walsh, Greenwood, & Vodden, 2016). This reassessment and reevaluation have great possibilities, and the value of reciprocal collaborations is profound. The current social climate calls for responsiveness and urgency in the work of the university. Engaged scholarship involves utilizing the activities of the academy in reciprocal processes toward the production of knowledge for the use and benefit of clients and society (Tryon, 2018).

Arellano and Jones's (2018) description of engaged scholarship connects to this context. They define it as "a collaborative form of inquiry in which academics and practitioners leverage their different perspectives and competencies to coproduce knowledge about a complex problem or phenomenon that exists under conditions of uncertainty found in the world" (p. 803). Uncertainty, competing viewpoints, and leveraging processes are critical to engaged scholarship, yet they are not prominent within theoretical frameworks or how community-campus collaborations, knowledge mobilization and social innovation can leverage investment in higher education research and development (Levac, Parizeau, Varghese, Morton, Jackson, & Hawkins, 2018).

Historically, higher education institutions have complex relationships with their communities; however, the past 25 years represent a shift toward institutional models of community engagement that include community-based teaching, research, and service (Sandmann, Furco, & Adams, 2016; Weerts & Sandmann, 2010). As discussions and deliberation emerge around the world about the value of public education, what it means to be an engaged citizen, and what skills are needed for the jobs of the future, it is more critical than ever to extend the institutional mission of global higher education institutions and look for ways to build effective partnerships (Van Eerd & Saunders, 2017). Universities cannot remain as ivory towers, but should attempt to be places that influence, and are influenced by, the world around them (McNall, Barnes-Najor, Brown, Doberneck, & Fitzgerald, 2015). Becoming more community-oriented specifies that universities can and should recommit to reinforce their capacity to react to community and societal needs. Therefore, the basic feature of a global university should be to integrate education and research processes in order to help society (Nichols, Phipps, Provencal, & Hewitt, 2013).

Research for Knowledge Mobilization

Research often exists in an academic vacuum where findings often end up behind paywalls or sitting on dusty shelves that practitioners do not know exist (Anderson & McLachlan, 2016). Research-based knowledge that does manage to get translated into best practice typically takes more than ten years to implement. Consequently,

researchers should take initial steps toward ensuring that their research actually makes its way into the public realm (Frank & Landström, 2016).

In clinical settings, the connection between research and practice is well developed. For example, there is a large body of research in the health care sector dedicated to the dissemination of research findings to practitioners. Although in health care gaps exist between evidence and practice, it has a research culture with wide acceptance of evidence to inform practice (Yohalem & Tseng, 2015).

Research and development programs and universities are starting to commit to the dissemination of information and have begun turning to the internet as a vehicle to enable dissemination (Read, Cooper, Edelstein, Sohn, & Levin, 2013). The internet makes vast amounts of information available to every user and has become the primary vehicle for information sharing (Faubert, Edelstein, & Qi, 2012). In order to sustain engagement across community and academic settings, there is a need to identify the factors that foster reciprocity and mutual benefit between community and academic partners (Bayley, Phipps, Batac, & Stevens, 2018).

Knowledge mobilization provides a vehicle for making academic research accessible to non-academic audiences and supports collaborations between academic researchers and non-academic partners (Campbell, Pollock, Briscoe, Carr-Harris, & Tuters). Knowledge mobilization supports dissemination beyond traditional academic publishing and conference presentations (Ion & Iucu, 2014). This dissemination can include publishing activities such as press releases, clear language research summaries, as well as more interactive tools such as social media (Kyvik, 2013). It also involves active, in person methods such as research events where researchers engage actively with organizations seeking to engage with research and research expertise (Phipps, 2011; Qi & Levin, 2013). The goal of dissemination is to move research out of the academic setting and into practice and policy settings where it can make an impact (MacKenzie, Christensen, & Turner, 2015).

However, a parallel trend further complicating the challenges is the well-documented and growing public indifference to expert judgment in education research (Morton, 2015). In part to combat the changes in attitudes and seeming loss of public faith in education research, a central goal of knowledge mobilization is to increase the use of research evidence in policy making and inform practice through iterative social processes involving interaction with groups of constituents (Campbell, Pollock, Briscoe, Carr-Harris, & Tuters, 2017; Brown, 2014). Yet, the kinds of research the organization is producing can indicate the kinds of evidence it values (Cherney, Povey, Head, Boreham, & Ferguson, 2012). In addition to determining what counts as evidence, there are no established criteria for the quality of evidence (Nutley, Powell, & Davies, 2013). The credibility of research has been linked to the perceptions of the quality and reputation of the source (Rowell, 2017),

while a perceived lack of quality can inhibit the use of research (Ion, Iftimescu, Proteasa & Marin, 2019; Nutley, Walter, & Davies, 2007).

Weiss' (1979) theory of research use is essential to understanding research use and its impact: instrumental use, conceptual use, and symbolic use which have been adapted to apply to Kmb. Instrumental use refers to specific pieces of research use and the "direct impact of research on policy and practice decisions" (Nutley et al., 2007, p. 36). Conceptual use, according to Nutley et al. (2007), relates to the complex, indirect ways that research changes ways of thinking, alerting policymakers to an issue, or general "consciousness-raising" (p. 36). Symbolic use refers to ways of using research to validate preexisting notions or suppositions (Nutley, 2013). Understanding research use in its various forms can inform how impact is measured (Fauzi, Nya-Ling, Thursamy, & Ojo, 2019).

Opposing Views

The concept of using evidenced-informed practices or research-based evidence to make improvements in practice is not without its critics (Nutley et al., 2007). However, the idea of using more research-based evidence in practice has gained enhanced attention in the education sphere within the context of global emphasis on increased global higher education accountability (Scanlan, 2018). As a result, Kmb that promotes the use of research and evidence is now positioned as vital to validating changes in practice (Zuiker, Piepgrass, Tefera, Anderson, Winn, & Fischman, 2017). Entrepreneurial researchers now think differently about the research process by using Kmb strategies to promote the use of research-based evidence among stakeholders (Fischman, Anderson, Tefera, & Zuiker, 2018).

Global higher education is changing to an increased emphasis on research use, and traditional research cycles now include detailed processes and strategies of Kmb, and different platforms of dissemination (Loebbecke, van Fenema, & Powell, 2016). Based on these changes, researchers must approach the research process with a new and expanded way of thinking about research and its use (Nelson, London, & Strobel, 2015). Therefore, it is necessary for researchers to make their research more meaningful, to increase dissemination to the appropriate audience, and to help build capacity for integrating research into practice (Cain, Shore, Weston, & Sanders, 2018). These arguments suggest a requirement for improved research-based understandings of evidence use in policy (Rickinson, Walsh, De Bruin, & Hall, 2018). Further, they suggest a need for studies on the use of evidence; take a wider interpretation of evidence; engage with policymakers; and seriously consider the needs and interest of policymakers (Castellani, Valente, Cori, & Biachi, 2016).

CONCLUSION

Universities play a significant role in creating, sharing, transfer and application of knowledge in the digital economy and society. Colleges and universities are important incubators for research, talent and innovation because they attract top students, resourceful faculty, prestigious research grants, business and jobs. They are also uniquely positioned to provide leadership for future innovation, development and change through the use of KMb.

Higher education is widely perceived to be the foundation of a society's productivity and economic well-being and must adapt or get left behind. Knowledge-based organizations such as global higher education are perceived to have the most to gain through knowledge mobilization, but to be effective may require a significant change in culture and values, organizational structures and reward systems. These changes are not easy to implement in global universities. KMb can and should create an innovative relationship between work and education, help students to more closely contribute to the reconnection of learning with experience, and help the global higher education institutions to increase their contributions to society.

REFERENCES

- Al-Kurdi, O., El-Haddadeh, R., & Eldabi, T. (2018). Knowledge sharing in higher education institutions: A systematic review. *Journal of Enterprise Information Management*, 31(2), 226–246. doi:10.1108/JEIM-09-2017-0129
- Altbach, P. G., Reisberg, L., & Rumbley, L. E. (2019). *Trends in global higher education: Tracking an academic revolution*. Leiden, The Netherlands: Brill Sense.
- Anderson, C. R., & McLachlan, S. M. (2016). Transformative research as knowledge mobilization: Transmedia, bridges, and layers. *Action Research*, 14(3), 295–317. doi:10.1177/1476750315616684
- Arellano, I., & Jones, S. J. (2018). Exploration of university faculty perceptions and experiences of service-learning as engaged scholarship of teaching and learning. *The Journal of Scholarship of Teaching and Learning*, 18(4). doi:10.14434/josotl.v18i4.23178
- Barley, W. C., Treem, J. W., & Kuhn, T. (2018). Valuing multiple trajectories of knowledge: A critical review and agenda for knowledge management research. *The Academy of Management Annals*, 12(1), 278–317. doi:10.5465/annals.2016.0041

- Bayley, J. E., Phipps, D., Batac, M., & Stevens, E. (2018). Development of a framework for knowledge mobilisation and impact competencies. *Evidence & Policy: A Journal of Research, Debate and Practice*, 14(4), 725–738. doi:10.1332/174426417X14945838375124
- Bejinaru, R. (2016). Knowledge dynamics impact on intellectual capital in organizations. *Journal of Management Dynamics in the Knowledge Economy*, 4(4), 515–534.
- Bejinaru, R., & Prelipcean, G. (2017). Successful strategies to be learnt from world-class universities. In *Proceedings of the 11th International Conference on Business Excellence* (pp.469-492). Bucharest, Poland: ASE. 10.1515/picbe-2017-0037
- Bourn, D. (2018). *Understanding global skills for 21st Century professions*. New York, NY: Springer. doi:10.1007/978-3-319-97655-6
- Bowers, A. M. (2017). University-community partnership models: Employing organizational management theories of paradox and strategic contradiction. *Journal of Higher Education Outreach & Engagement*, 21(2), 37–64.
- Bratianu, C. (2015). *Organizational knowledge dynamics: Managing knowledge creation, acquisition, sharing, and transformation*. Hershey, PA: IGI Global. doi:10.4018/978-1-4666-8318-1
- Broekkamp, H., & van Hout-Wolters, B. (2007). The gap between educational research and practice: A literature review, symposium, and questionnaire. *Educational Research and Evaluation*, 13(3), 203–220. doi:10.1080/13803610701626127
- Brown, C. (2014). Advancing policy makers' expertise in evidence-use: A new approach to enhancing the role research can have in aiding educational policy development. *Journal of Educational Change*, 15(1), 19–36. doi:10.1007/10833-013-9224-7
- Cai, Y. (2017). From an analytical framework for understanding the innovation process in higher education to an emerging research field of innovations in higher education. *The Review of Higher Education*, 40(4), 585–616. doi:10.1353/rhe.2017.0023
- Cain, K., Shore, K., Weston, C., & Sanders, C. B. (2018). Knowledge mobilization as a tool of institutional governance: Exploring academics' perceptions of "going public". *Canadian Journal of Higher Education/Revue canadienne d'enseignement supérieur*, 48(2), 39-54.
- Cain, T. (2019). School-university links for evidence-informed practice. *Education in Science*, 9(2), 97. doi:10.3390/educsci9020097

- Campbell, C., Pollock, K., Briscoe, P., Carr-Harris, S., & Tuters, S. (2017). Developing a knowledge network for applied education research to mobilize evidence in and for educational practice. *Educational Research*, 59(2), 209–227. doi:10.1080/00131881.2017.1310364
- Castellani, T., Valente, A., Cori, L., & Bianchi, F. (2016). Detecting the use of evidence in a meta-policy. *Evidence & Policy*, 12(1), 91–107. doi:10.1332/174426415X14430152798949
- Caulfield, T., & Ogbogu, U. (2015). The commercialization of university-based research: Balancing risks and benefits. *BMC Medical Ethics*, 16(70), 1–7. doi:10.1186/12910-015-0064-2 PMID:26464028
- Chan, Y. E., & Farrington, C. J. (2018). Community-based research: Engaging universities in technology-related knowledge exchanges. *Information and Organization*, 28(3), 129–139. doi:10.1016/j.infoandorg.2018.08.001
- Chen, H. M., Yuan, Y. H., Wu, C. H., & Dai, C. Y. (2017). Moderator effects of proactive knowledge transfer among knowledge transfer usefulness, management, and innovation: A study of knowledge innovation effective model construction. *International Journal of Knowledge Management*, 13(1), 16–33. doi:10.4018/IJKM.2017010102
- Chen, I. S., Chen, J. K., & Padró, F. F. (2017). Critical quality indicators of higher education. *Total Quality Management & Business Excellence*, 28(1-2), 130–146. doi:10.1080/14783363.2015.1050178
- Cherney, A. (2015). Academic–industry collaborations and knowledge co-production in the social sciences. *Journal of Sociology (Melbourne, Vic.)*, 51(4), 1003–1016. doi:10.1177/1440783313492237
- Cherney, A., Povey, J., Head, B., Boreham, P., & Ferguson, M. (2012). What influences the utilisation of educational research by policy-makers and practitioners? The perspectives of academic educational researchers. *International Journal of Educational Research*, 56, 23–34. doi:10.1016/j.ijer.2012.08.001
- Cioffi, C., Dalessio, A., & Gomez-Paloma, F. (2016). From knowledge to competence: The process of converting theory-practice. *Knowledge Cultures*, 1(6), 87–91.
- Cooper, A. (2014). Knowledge mobilization intermediaries in education: A cross-case analysis of 44 Canadian organizations. *Evidence & Policy*, 10(1), 29–59. doi:10.1332/174426413X662806

- Cooper, A. (2017). How are educational researchers interacting with end-users to increase impact? *Engaged Scholar Journal: Community-Engaged Research, Teaching, and Learning*, 3(2), 99–122.
- Cooper, A., Rodway, J., & Reid, R. (2018). Knowledge mobilization practices of educational researchers across Canada. *Canadian Journal of Higher Education/Revue canadienne d'enseignement supérieur*, 48(1), 1-21.
- Cuthill, M., O'Shea, E., Wilson, B., & Viljoen, P. (2014). Universities and the public good: A review of knowledge exchange policy and related university practice in Australia. *Australian Universities Review*, 56(2), 36.
- D'Este, P., Ramos-Vielba, I., Woolley, R., & Amara, N. (2018). How do researchers generate scientific and societal impacts? Toward an analytical and operational framework. *Science & Public Policy*, 45(6), 752–763. doi:10.1093/cipolcy023
- Driscoll, A., & Sandmann, L. R. (2016). From maverick to mainstream: The scholarship of engagement. *Journal of Higher Education Outreach & Engagement*, 20(1), 83–94.
- Edelstein, H. (2016). Collaborative research partnerships for knowledge mobilisation. *Evidence & Policy: A Journal of Research, Debate and Practice*, 12(2), 199–216. doi:10.1332/174426415X14399903490979
- Edwards, J. S. (2017). Knowledge sharing: At the heart of knowledge management. In P. Jain & N. Mnjama (Eds.), *Managing knowledge resources and records in modern organizations* (pp. 1–14). Hershey, PA: IGI Global. doi:10.4018/978-1-5225-1965-2.ch001
- Etzkowitz, H. (2008). *The Triple Helix: University-industry-government innovation in action*. London, UK: Routledge. doi:10.4324/9780203929605
- Faubert, B., Edelstein, H., & Qi, J. (2012). Understanding how organizations use the Internet to mobilise knowledge: Findings from the field of education. *International Journal of Management in Education, Special Issue — Knowledge Management in Higher Education*, 6(1-2), 1-21.
- Fauzi, M., Nya-Ling, C., Thursamy, R., & Ojo, A. (2019). Knowledge sharing. *VINE Journal of Information and Knowledge Management Systems*, 49(1), 136–159. doi:10.1108/VJIKMS-09-2018-0074
- Fenwick, T. J., & Farrell, L. (2012). *Knowledge mobilization: Politics, languages, and responsibilities*. New York, NY: Routledge.

Feuer, M. J. (2016). *The rising price of objectivity: Philanthropy, government, and the future of education research*. Cambridge, MA: Harvard Education Press.

Fischman, G. E., Anderson, K. T., Tefera, A. A., & Zuiker, S. J. (2018). If mobilizing educational research is the answer, who can afford to ask the question? An analysis of faculty perspectives on knowledge mobilization for scholarship in education. *AERA Open*, 4(1). doi:10.1177/2332858417750133

Frank, H., & Landström, H. (2016). What makes entrepreneurship research interesting? Reflections on strategies to overcome the rigor–relevance gap. *Entrepreneurship and Regional Development*, 28(1-2), 51–75. doi:10.1080/08985626.2015.1100687

Fullwood, R., Rowley, J., & Delbridge, R. (2013). Knowledge sharing amongst academics in UK universities. *Journal of Knowledge Management*, 17(1), 123–136. doi:10.1108/13673271311300831

Giles, D. E. Jr. (2016). Understanding an emerging field of scholarship: Toward a research agenda for engaged, public scholarship. *Journal of Higher Education Outreach & Engagement*, 20(1), 181–191.

Grau, F. X., Goddard, J., Hall, B. L., Hazekorn, E., & Tandon, R. (2017). *Higher education in the world, towards a socially responsible university: Balancing the global with the local*. Barcelona, Spain: Girona Global University Network for Innovation.

Hall, B. L., Jackson, E. T., & Tandon, R. (Eds.). (2016). *Knowledge, democracy and action: Community-university research partnerships in global perspectives*. Oxford, UK: Oxford University Press. doi:10.7765/9781526137081

Hall, H., Walsh, J., Greenwood, R., & Vodden, K. (2016). Advancing innovation in Newfoundland and Labrador: Insights for knowledge mobilization and university-community engagement. *Journal of Community Engagement and Scholarship*, 9(1), 19–30.

Harkavy, I., & Hartley, M. (2012). Integrating a commitment to the public good into the institutional fabric: Further lessons from the field. *Journal of Higher Education Outreach & Engagement*, 16(4), 17.

Hsin-Chieh, K. U. N. G., & Chi-Fang, L. I. U. (2018). Service learning and alumni-granted industry-academic collaborations. *Journal of Social and Administrative Sciences*, 5(3), 239–246.

Ion, G., Iftimescu, S., Proteasa, C., & Marin, E. (2019). Understanding the role, expectations, and challenges that policy-makers face in using educational research. *Education in Science*, 9(2), 81. doi:10.3390/educsci9020081

- Ion, G., & Iucu, R. (2014). Professionals' perceptions about the use of research in educational practice. *European Journal of Higher Education*, 4(4), 334–347. doi: 10.1080/21568235.2014.899154
- Ion, G., Marin, E., & Proteasa, C. (2019). How does the context of research influence the use of educational research in policy-making and practice? *Educational Research for Policy and Practice*, 18(2), 119–139. doi:10.1007/10671-018-9236-4
- Jones, S., Procter, R., & Younie, S. (2015). Participatory knowledge mobilization: An emerging model for translational research in education. *Journal of Education for Teaching*, 41(5), 555–574. doi:10.1080/02607476.2015.1105540
- Kaweesi, M. (2018). Scholarly conceptions of the nature of academic research in universities: A literature review. [IJE]. *Interdisciplinary Journal of Education*, 1(2), 208–229.
- Kenny, J. (2017). Academic work and performativity. *Higher Education*, 74(5), 897–913. doi:10.1007/10734-016-0084-y
- Klein, S. S., & Gwaltney, M. K. (1991). Charting the education dissemination system: Where we are and where we go from here. *Knowledge (Beverly Hills, Calif.)*, 12(3), 241–265. doi:10.1177/107554709101200304
- Kyvik, S. (2013). The academic researcher role: Enhancing expectations and improved performance. *Higher Education*, 65(4), 525–538. doi:10.1007/10734-012-9561-0
- Landri, P. (2012). Multiple enactments of educational research. *European Educational Research Journal*, 11(1), 62–67. doi:10.2304/eej.2012.11.1.62
- Lane, K. E., Lemoine, P. A., Tinney, T. M., & Richardson, M. D. (2014). Modify and adapt: Global higher education in a changing economy. *International Journal of Innovation in the Digital Economy*, 5(2), 26–38. doi:10.4018/ijide.2014040103
- Lemoine, P. A., Hackett, P. T., & Richardson, M. D. (2016). Higher education at a crossroads: Accountability, globalism and technology. In W. Nuninger & J.-M. Chatelet (Eds.), *Handbook of research on quality assurance and value management in higher education* (pp. 27–57). Hershey, PA: IGI. doi:10.4018/978-1-5225-0024-7.ch002
- Levac, L., Parizeau, K., Varghese, J., Morton, M., Jackson, E., & Hawkins, L. (2018). Towards a framework for building community-university resilience research agendas. *Social Sciences*, 7(12), 260. doi:10.3390/ocsci7120260
- Levin, B. (2013). To know is not enough: Research knowledge and its use. *Review of Education*, 1(1), 2–31. doi:10.1002/rev3.3001

- Levin, B., & Qi, J. (2013). Introduction and synthesis. In B. Levin, J. Qi, H. Edelstein, & J. Sohn (Eds.), *Mobilizing research knowledge: International perspectives*. Bristol, UK: Policy Press.
- Lightowler, C., Stocks-Rankin, C. R., & Wilkinson, H. (2018). How practitioner-led research could have greater impact: The importance of considering knowledge mobilisation holistically. *Evidence & Policy: A Journal of Research. Debate and Practice*, 14(4), 641–663. doi:10.1332/174426417X14987303892424
- Loebbecke, C., van Fenema, P. C., & Powell, P. (2016). Managing inter-organizational knowledge sharing. *The Journal of Strategic Information Systems*, 25(1), 4–14. doi:10.1016/j.jsis.2015.12.002
- MacKenzie, C. A., Christensen, J., & Turner, S. (2015). Advocating beyond the academy: Dilemmas of communicating relevant research results. *Qualitative Research*, 15(1), 105–121. doi:10.1177/1468794113509261
- McNall, M. A., Barnes-Najor, J. V., Brown, R. E., Doberneck, D. M., & Fitzgerald, H. E. (2015). Systemic engagement: Universities as partners in systemic approaches to community change. *Journal of Higher Education Outreach & Engagement*, 19(1), 7–32.
- Mense, E. G., Lemoine, P. A., Garretson, C. J., & Richardson, M. D. (2018). The development of global higher education in a world of transformation. *Journal of Education and Development*, 2(3), 47. doi:10.20849/jed.v2i3.529
- Michels, N. (2018). ‘Value-in’ partnership: Common ground and difference in university knowledge transfer policy and research. *International Journal of Technology Management & Sustainable Development*, 17(3), 203–225. doi:10.1386/tmsd.17.3.203_1
- Middleton, A. T., & Whitmore, E. (2017). Information into knowledge: Navigating the complexity in the campus community engagement context. *Evidence & Policy: A Journal of Research. Debate and Practice*, 13(3), 455–476. doi:10.1332/174426416X14614935571225
- Morgan, B. (2014). Income for outcome: Australia and New Zealand are experimenting with ways of assessing the impact of publicly funded research. *Nature*, 511, S72–S75. doi:10.1038/511S72a PMID:25054855
- Morton, S. (2015). Progressing research impact assessment: A ‘contributions’ approach. *Research Evaluation*, 24(4), 405–419. doi:10.1093/reseval/rvv016

- Mosher, J., Anucha, U., Appiah, H., & Levesque, S. (2014). From research to action: Four theories and their implications for knowledge mobilization. *Scholarly and Research Communication*, 5(4), 1–17. doi:10.22230/rc.2014v5n3a161
- Naidorf, J. C. (2014). Knowledge utility: From social relevance to knowledge mobilization. *Education Policy Analysis Archives*, 22(89).
- Nelson, I. A., London, R. A., & Strobel, K. R. (2015). Reinventing the role of the university researcher. *Educational Researcher*, 44(1), 17–26. doi:10.3102/0013189X15570387
- Nichols, N., Gaetz, S., & Phipps, D. (2015). Generating social change through community–campus collaboration. *Journal of Higher Education Outreach & Engagement*, 19(3), 7–32.
- Nichols, N., Phipps, D. J., Provençal, J., & Hewitt, A. (2013). Knowledge mobilization, collaboration, and social innovation: Leveraging investments in higher education. *Canadian Journal of Nonprofit and Social Economy Research*, 4(1), 25–42. doi:10.22230/cjnser.2013v4n1a126
- Nutley, S., Walter, I., & Davies, H. T. O. (2007). *Using evidence: How research can inform public services*. Briston, UK: Policy Press. doi:10.2307/j.ctt9qgw1
- Nutley, S. M. (2013). Reflections on mobilising education research. In B. Levin (Ed.), *The impact of research in education: An international perspective*. Bristol, UK: The Policy Press.
- Nutley, S. M., Powell, A. E., & Davies, H. T. O. (2013). *What counts as good evidence?* London, UK: Alliance for Useful Evidence.
- Orr, K., & Jung, T. (2016). Co-producing knowledge and practice. In *Knowledge and practice in business and organisations* (pp. 221–235). New York, NY: Routledge. doi:10.4324/9781315674025
- Özdemir, V. (2018). Precision medicine goes global: How to get it right? Four ways to mobilize scientific knowledge. *OMICS: A Journal of Integrative Biology*, 22(8), 539–543. doi:10.1089/omi.2018.0104 PMID:30004300
- Phipps, D. (2011). A report detailing the development of a university-based knowledge mobilization unit that enhances research outreach and engagement. *Scholarly Research and Communications*, 2(2), 1–13.
- Phipps, D., Cummings, J., Pepler, D., Craig, W., & Cardinal, S. (2016). The co-produced pathway to impact describes knowledge mobilization processes. *Journal of Community Engagement and Scholarship*, 9(1), 31–40.

- Phipps, D. J., Johnny, M., & Wedlock, J. (2015). An institutional process for brokering community-campus research collaborations. *Engaged Scholar Journal: Community-Engaged Research, Teaching, and Learning*, 1(1).
- Prendergast, S., & Rickinson, M. (2019). Understanding school engagement in and with research. *Australian Educational Researcher*, 46(1), 17–39. doi:10.1007/13384-018-0292-9
- Pucciarelli, F., & Kaplan, A. (2016). Competition and strategy in higher education: Managing complexity and uncertainty. *Business Horizons*, 59(3), 311–320. doi:10.1016/j.bushor.2016.01.003
- Qi, J., & Levin, B. (2013). Assessing organizational efforts to mobilize research knowledge in education. *Education Policy Analysis Archives*, 21(2).
- Read, R., Cooper, A., Edelstein, H., Sohn, J., & Levin, B. (2013a). Mobilizing research knowledge: How universities share research knowledge. In B. Levin, J. Qi, H. Edelstein, & J. Sohn (Eds.), *The impact of research in education: An international perspective* (pp. 23–39). Bristol, UK: Policy Press.
- Read, R., Cooper, A., Edelstein, H., Sohn, J., & Levin, B. (2013b). Knowledge mobilization and utilization. In B. Levin, J. Qi, H. Edelstein, & J. Sohn (Eds.), *The impact of research in education: An international perspective* (pp. 65–84). Bristol, UK: The Policy Press.
- Rickinson, M., de Bruin, C., Walsh, L., & Hall, M. (2017). What can evidence-use in practice learn from evidence-use in policy? *Educational Research*, 59(2), 173–189. doi:10.1080/00131881.2017.1304306
- Rickinson, M., Walsh, L., De Bruin, K., & Hall, M. (2018). Understanding evidence use within education policy: A policy narrative perspective. *Evidence & Policy: A Journal of Research. Debate and Practice*, 15(2), 235–252. doi:10.1332/174426418X15172393826277
- Röpke, J. (2006). Knowledge mobilization and academic entrepreneurship. *Journal of Entrepreneurship Research*, 1(1), 33–61.
- Rowell, L. (2017). Knowledge mobilization and action research in global contexts: Towards a comparative orientation. *Educational Action Research*, 25(3), 333–336. doi:10.1080/09650792.2017.1326759

- Rowell, L. L., & Hong, E. (2017). Knowledge democracy and action research: Pathways for the twenty-first century. In *The Palgrave international handbook of action research* (pp. 63–83). New York, NY: Palgrave Macmillan. doi:10.1057/978-1-137-40523-4_5
- Sandmann, L. R., Furco, A., & Adams, K. R. (2016). Building the field of higher education engagement: A 20-year retrospective. *Journal of Higher Education Outreach & Engagement*, 20(1), 1–14.
- Scanlan, J. (2018). A capability maturity framework for knowledge transfer. *Industry and Higher Education*, 32(4), 235–244. doi:10.1177/0950422218770335
- Schulze-Cleven, T., & Olson, J. R. (2017). Worlds of higher education transformed: Toward varieties of academic capitalism. *Higher Education*, 73(6), 813–831. doi:10.1007/10734-017-0123-3
- Silova, I., Read, R., Mundy, K., & Epstein, E. H. (2016). The mobilization of knowledge. In *Crafting a global field* (pp. 155–167). Cham, Switzerland: Springer. doi:10.1007/978-3-319-33186-7_9
- Strier, R. (2014). Fields of paradox: University–community partnerships. *Higher Education*, 68(2), 155–165. doi:10.1007/10734-013-9698-5
- Tryon, E. A. (2018). Regional perspectives on learning by doing: Stories from engaged universities around the world. *Journal of Higher Education Outreach & Engagement*, 22(2), 237–242.
- Van Eerd, D., & Saunders, R. (2017). Integrated knowledge transfer and exchange: An organizational approach for stakeholder engagement and communications. *Scholarly and Research Communication*, 8(1).
- Vila, L. E. (2019). The micro-macro interfaces of higher education, innovation, regional growth and regional development. In *New paths of entrepreneurship development* (pp. 141–166). Cham, Switzerland: Springer. doi:10.1007/978-3-319-96032-6_8
- Wadhwa, R. (2016). New phase of internationalization of higher education and institutional change. *Higher Education for the Future*, 3(2), 227–246. doi:10.1177/2347631116650548
- Weerts, D. J., & Sandmann, L. R. (2010). Community engagement and boundary-spanning roles at research universities. *The Journal of Higher Education*, 81(6), 632–657. doi:10.1080/00221546.2010.11779075

Knowledge Mobilization and Global Higher Education

Weiss, C. H. (1979). The many meanings of research utilization. *Public Administration Review*, 39(5), 426–431. doi:10.2307/3109916

Wells, P. J. (2017). The role of higher education institutions today. In F. X. Grau, J. Goddard, B. L. Hall, E. Hazelkorn, & R. Tandon (Eds.), *Higher education in the world, towards a socially responsible university: Balancing the global with the local*. Barcelona, Spain: Girona Global University Network for Innovation.

Yohalem, N., & Tseng, V. (2015). Commentary: Moving from practice to research, and back. *Applied Developmental Science*, 19(2), 117–120. doi:10.1080/10888691.2014.983033

Yuan, C., Li, Y., Vlas, C. O., & Peng, M. W. (2018). Dynamic capabilities, subnational environment, and university technology transfer. *Strategic Organization*, 16(1), 35–60. doi:10.1177/1476127016667969

Zuiker, S. J., Piepgrass, N., Tefera, A., Anderson, K. T., Winn, K., & Fischman, G. (2017). Recognizing and transforming knowledge mobilization in colleges of education. *International Journal of Education Policy and Leadership*, 15(1). doi:10.22230/ijepl.2019v15n1a808

ADDITIONAL READING

Andersen, B., & Wong, D. (2013, February). *The new normal: Competitive advantage in the digital economy*. London: Big Innovation Centre. Available at: <https://www.biginnovationcentre.com/Assets/Docs/The%20New%20Normal.pdf>

Barwick, M. Phipps, D., Myers, G., Johnny, M., & Coriandoli, R. (2014). Knowledge translation and strategic communications: Unpacking differences and similarities for scholarly and research communications. *Scholarly and Research Communication*, 5(3):0305175, 14.

Bowen, S. J., & Graham, I. D. (2013). From knowledge translation to engaged scholarship: Promoting research relevance and utilization. *Archives of Physical Medicine and Rehabilitation*, 94(1), S3–S8. doi:10.1016/j.apmr.2012.04.037 PMID:23141502

Gorostiaga, J. M., Palamidessi, M. I., & Aberbuj, C. M. (2018). Policy centers and knowledge mobilization in the field of education in Argentina. *Education Policy Analysis Archives*, 26, 72. doi:10.14507/epaa.26.3395

Jacobson, N., Ochocka, J., Wise, J., & Janzen, R. (2007). Inspiring knowledge mobilization through a communications policy: The case of a community university research alliance. *Progress in Community Health Partnerships*, 1(1), 99–104. doi:10.1353/cpr.0.0004 PMID:20208278

Lemay, M. A., & Sá, C. (2012). Complexity sciences: Towards an alternative approach to understanding the use of academic research. *Evidence & Policy: A Journal of Research. Debate and Practice*, 8(4), 473–494. doi:10.1332/174426412X660133

Murphy, D., & McGrath, D. (2018). A success/failure paradox: Reflection on a university-community engagement in Australia. *Journal of Higher Education Policy and Management*, 40(4), 321–341. doi:10.1080/1360080X.2018.1482102

Ramayah, T., Yeap, J. A., & Ignatius, J. (2013). An empirical inquiry on knowledge sharing among academicians in higher learning institutions. *Minerva*, 51(2), 131–154. doi:10.1007/11024-013-9229-7

Reid, S. (2014). Knowledge influencers: Leaders influencing knowledge creation and mobilization. *Journal of Educational Administration*, 52(3), 332–357. doi:10.1108/JEA-01-2013-0013

Sá, C. M., Li, S. X., & Faubert, B. (2011). Faculties of education and institutional strategies for knowledge mobilization: An exploratory study. *Higher Education*, 61(5), 501–512. doi:10.1007/10734-010-9344-4

Younie, S., Audain, J., Eloff, I., Leask, M., Procter, R., & Shelton, C. (2018). Mobilising knowledge through global partnerships to support research-informed teaching: Five models for translational research. *Journal of Education for Teaching*, 44(5), 574–589. doi:10.1080/02607476.2018.1516348

KEY TERMS AND DEFINITIONS

Engagement: Is the means for working with those inside and outside global higher education to not to only distribute the knowledge, but to share it in such a way that others become part of the distribution and use of knowledge. it is easily accessible, useful and used.

Global Higher Education: Is the distributed efforts of universities and others to provide higher education around the world.

Knowledge Dissemination: Is the transfer of knowledge with the intension that it be used for education or to help implement or improves practices.

Knowledge Mobilization and Global Higher Education

Knowledge Mobilization: All the products created and activities employed to help research and knowledge be useful and used.

Knowledge-Based Economy: Is the term used to describe the interconnectedness of national economies.

Research: Data and information generated for use, information and dissemination.

Chapter 2

A Mapping of Knowledge Management Techniques and Tools for Sustainable Growth in the Public Sector

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ABSTRACT

This chapter seeks to determine the criteria that lead to the excellence of knowledge management in the public sector. The authors discuss issues of what exactly knowledge means and how knowledge management is defined, how an organization will capture, preserve, and diffuse knowledge, and why knowledge management is ultimately important for predictable future developments. Knowledge management is considered a prerequisite for achieving innovation and competitiveness both within and outside the organization as it promotes the consolidation of an organization in the long term with a clear focus on strategic importance. Likewise, knowledge management programs can be applied to different areas of an organization in the public sector. However, it should be mentioned that the difficulties that arise in their implementation are many, as various concerns arise, which are directly related to the equal mappings of knowledge and its measurement.

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INTRODUCTION

After of a careful analysis in the literature, we found that over the last five years, efforts have been made (academic and operational) to develop methodologies and tools for implementing Knowledge Management techniques, in analyzing different case studies that focus in the use of Knowledge Management in the private sector by trying to provide an understanding of how the application of Knowledge Management can influence the excellence of an organization in order to effectively evaluating the promised sustainable benefits. However the research in the Greek domain, regarding the use of KM in the public sector is scarce. Thus the current chapter will contribute will try to provide a mapping of all the necessary factors that contribute to the successful implementation of Knowledge Management for public organizations in Greece. Specifically, excellence models will be assessed, such as the model proposed by EFQM, the Common Assessment Framework (CAF), Baldrige's excellence model, the 2006 Quality Award model, and looking for the Knowledge Management application areas in them, with the ultimate goal of identifying the criteria for achieving the excellence of Knowledge Management in the Geek public organizations in relation to the principles included in..

DEFINING KNOWLEDGE MANAGEMENT IN THE PUBLIC SECTOR

According to Chourides et al. (2003) about knowledge is the understanding gained through experience, observation and daily operational tasks study. In a retrospective development of the rationale of knowledge, three different approaches or types of Knowledge are mentioned exist, (1) the positivistic approach, (2) the interpretative approach, and (3) the organic approach. Initially, there was a confusion in the definition of Data, Information, and Knowledge (Bhatt, 2001). More specifically and in accordance with the positivistic approach, Knowledge and Data have been used simultaneously. For this reason, particular emphasis was placed on data generation and measurement and storage for further use.

Later on, with the interpretive approach, it is perceived that there is a differentiation between data and information, and it is defined and knowledge management requires the conception and scheduling of information (Marr & Spender, 2002). With the organic approach, concepts are separated, defining Data as structured transaction records and Information as Data in a message format (Davenport & Prusak, 1998), in the sense of being a sender and a recipient. According to this definition, the Data inform and, by extension, influence or alter the perception of the recipient. The organic approach is supposed to reflect the current reality.

Finally, according to Marr and Spender (2004), knowledge in public sector use is the “fluid” mix, consisting of experiences, values, related information and expert insight, which also provide the framework for evaluation and the integration of new experiences and information. To summarize the above, the process leading to knowledge is as follows: Data – Information – Knowledge. Likewise, Bhatt (2001) states that it reeferes through other concepts and depending on the user’s perspective that the separation between data, information and knowledge is possible. Data are generally considered to be separated facts of organized Information and thus Knowledge is important information, meaning meaningful. The relationship of the above concepts is periodically repeated, due to the continuous interaction, according to the following scheme and depends both on the degree of organization and interpretation (points of differentiation between data and information and information and knowledge, respectively). For instance in public organizations it is reported that it depends on the internal organization’s database, as the development and diffusion of knowledge within the organization is affected with inter-organizational expansion of knowledge both on the knowledge originally acquired and the intensive learning (Cohen & Levinthal, 1990). Thus, it is argued that the existence of knowledge facilitates its further development and as such these are considered to be the basis for developing the competitive advantage of the organization. To summarize the above, Bhatt (2001) concludes and agrees with the definition that knowledge is the organized combination of data that is represented by a set of rules, processes and functions, and this combination is learned through experience and act (Sheng & Huang, 2005).

KNOWLEDGE MANAGEMENT AND TOTAL QUALITY MANAGEMENT IN ORGANIZATIONS

As described by Hsu and Shen (2005), comparing the two management philosophies: Knowledge Management and Total Quality Management, there are common points between them, which are detailed below:

Orientation in Results

According to Total Quality Management (TQM), the ultimate goal of an organization is excellence, thus achieving the satisfaction of everything that is directly or indirectly related to the organization, noting not only the entire workforce but also the customers (i.e. the citizens) and/or users of the services or products provided by the public organization and potential shareholders (other public and private organizations). With the application of Knowledge Management, on the other hand, more importance

is given to HOW, ie, the ways in which knowledge can support the organization's overall mission and strategy.

People-Based Management

Total Quality Management (TQM) means that employees of an organization should know WHAT they have to do and HOW they will achieve it. In addition, it is necessary to encourage and motivate employees for responsible and quality work because operational excellence can be achieved by maximizing their contribution and engagement tactics.

On the other hand, the knowledge that every employee possesses cannot be passed on to the others if the employee himself is not willing to do so. Taking this into account, Knowledge Management attaches great importance to creating an appropriate environment for the transmission and creation of knowledge within the organization.

Teamwork

By setting an organization, according to the TQM, as a goal of overall quality, the weight should be given to teamwork. Collaboration among people with a common goal is identified by their quicker briefing on possible developments and improvements, and by the direct achievement of the desired quality.

Knowledge Management also preserves that if emphasis is placed on the individual projection of each employee, this will lead to a general reluctance to share his knowledge with others, bearing in mind that employees will lose some particular position or benefits within the organization. Immediate consequence of this is the indifference to the transfer and the development of Knowledge transfer modes, essential factors for successful Knowledge Management. So we end up with the importance of teamwork for Knowledge Management.

Leadership

The organization's leadership at the TQM identifies and announces the goals of the organization that workers are struggling with, while Knowledge Management points to the need for knowledge creation and sharing among the organization's leaders. The earnings of the organization through the implementation of Knowledge Management programs are usually visible in the long run and, moreover, may not be tangible, which makes the role of leadership once again, particularly important when asked to provide the appropriate arguments for further implementation of the programs in the organization. In addition to the responsibilities of the leadership, it

is also the creation of conditions (within the organization) that enable the production of valid and effective knowledge while increasing the personal commitment and responsible contribution / contribution of each employee.

Customer Satisfaction

It refers to the satisfaction of both internal and external customers, the urgent need for the organization to be the best in the customer's demand, be it services or products, taking into account that the expectations, tastes and requirements of the customer constantly change. The IOP emphasizes the importance of quality produced by the organization, with further aspirations, to satisfy both domestic and foreign clients, both in the short and long term. Knowledge Management focuses on activities that have the effect of spreading knowledge to customers, users and partners, with the ultimate goal of recognizing new innovation opportunities, while customers and users of their products or services are an important source of innovative ideas (Hipple, 1988. Continuing the Comparison of Total Quality Management and Knowledge Management (Hsu & Shen, 2005), the points of differentiation of the two administrative philosophies are mentioned:

Continuous Improvement: Innovation

The core of Total Quality Management is the continuous improvement, while core of Knowledge Management, innovation. Continuous improvement refers to the ultimate goal of the organization, the overall quality of products or services it provides in the long run to internal and external customers, users, implementers or partners.

Therefore, special attention is paid to continuous improvement, while you do not overlook the fact of the development - improvement of the public organizations as well as the possible increase of the requirements of customers/ or users.

The implementation of Knowledge Management programs, on the other hand, promises to ensure innovation and creativity in the organization. However, the phenomenon is that existing Knowledge Management programs are very conservative to absorb the changes that come from the perspective of the external cultural environment.

Event-Based Management: Creating a Culture

It is particularly important to know the stages of production of products and processes for Total Quality Management, as well as the ability to intervene at the various stages of product or service production processes, which makes it possible to improve them.

In addition, this way, it is possible to measure any improvement in the products or services provided by the organization, it now refers to specific events and not to unclear theories - phenomena that may have been perceived by an employee. The organization is called upon to react based on facts and measurements. Hence, we could argue that Knowledge Management programs, it is important to build an appropriate culture in the organization that will support the creation and sharing of knowledge.

KNOWLEDGE MANAGEMENT TECHNOLOGIES AND APPLICATIONS BIBLIOGRAPHIC REVIEW

All published articles from 1995 to 2002 (Shu-hsien Liaio, 2003) related to Knowledge Management (KM) were recorded and classified in order to provide the framework for the development of the knowledge management philosophy, the technology uses and depicts its practical applications in different fields of interest. The Elsevier publishing Organization was used as the database of this research and the search was based on the terms “Knowledge Management Applications” and “Knowledge Management Technologies”. With 234 articles divided into the following seven categories:

1. A conceptual framework for Knowledge Management Framework.
2. Knowledge based systems (Knowledge-based systems).
3. Data mining.
4. Information and communication technology (information and communication technology).
5. Artificial Intelligence / Expert Systems.
6. Database technology.
7. Modeling.

The following paragraphs summarize the results of the research in each of the seven categorization groups, providing relevant information and attributing the relevant terms and concepts of each category to the respective researchers involved.

Conceptual Framework for Knowledge Management Development

Many of them have dealt with the definition of the best conceptual definition, while formulating the other features that shape the broader context of its semantic

hypostasis: concepts, sub-definitions, objects, fields of interest, stages, activities, examples, prospects, size / indicator measurements, consequences.

Table 1 below lists the related scholars per field on issues related to the wider conceptual framework of knowledge management.

Knowledge Based Systems

Several were the authors, researchers who dealt with the contribution of Knowledge-based systems in the area of mood and knowledge in a business. Table 2 presents researchers who dealt with specific applications of KBS and which include: knowledge, rendering, applications in the oil industry (refineries), human resources management, databases, risk assessment, microbiology and project management.

Table 1. Knowledge management framework – applications

Knowledge management framework and its applications	
Knowledge management framework/applications	Authors
Knowledge creation	Nonaka et al. (1996)
Knowledge assets	Wilkins et al. (1997) and Wiig et al. (1997)
Methods and techniques KM development and history	Wiig et al. (1997) Wiig, 1997)
Organizational learning	Heijst et al. (1997)
Organizational innovation	Johannessen et al. (1999)
Intellectual capital	Liebowitz and Wright (1999)
Strategy management	Drew (1999) and Hendriks and Vriens (1999)
Organizational impact	Hendriks and Vriens (1999)
Systems thinking	Rubenstein-Montano et al. (2001)
Artificial intelligence/Expert systems	Liebowitz (2001)
Knowledge inertia	Liao (2002)

Table 2. Knowledge-based systems

Knowledge-based systems and its applications	
Knowledge-based systems/applications	Authors
Knowledge representation	Cauvin (1996) and Kim et al. (2000)
Petroleum industry	Cauvin (1996)
Human resource management	Martinsons (1997)
Database	Knight and Ma (1997)
Knowledge engineering	Wielinga et al. (1997)
Manufacturing	Kang et al. (1998)
Quality management	Stein and Miscikowski (1999)
Design	Lee and Lee (1999)
Military	Liao (2000, 2001)
Agriculture	Kim et al. (2000) and Fleurat-Lessard (2002)
Risk assessment	McMeekin and Ross (2002)
Microbiology	McMeekin and Ross (2002)
Project management	Tian et al. (2002)

Data Mining

Data Mining is a field that involves, characterized and characterized by different principles by combining areas such as artificial intelligence, computing, database management, statistics, as well as mathematical algorithms and artificial information imaging. Given the huge amount of information, DM is a Knowledge Discovery in Databases (KDD) technology. This technology provides and uses different methodologies for decision-making, resolving problems for analysis, programming, diagnosis, detection, upgrading, prevention, learning and innovation.

Information and Communication Technology

In today's information economy, direct access to knowledge is a crucial factor in the success of many organizations. The Information and Communication Technology (ICT) infrastructure provides a platform based on information systems and networks and serves the exchange of information, the coordination of activities, dissemination

of information, the emergence of areas of the private and the public sector as well as the support, dissemination and development of trade. Information systems provide significant IT capabilities and networks through which a digital upgrading and integration interface is achieved.

The Internet is a type of ICT that, along with some other networks, technologies and services such as Intranet, Extranet, virtual private network (VPN), and wireless networks builds and provides a virtual environment that creates and provides systematic knowledge, disseminating and spreading it quickly and integrating it into organizations. Some knowledge management software tools in ICT are studied according to their source and applications.

Some applications that have been implemented through information technology and technology are: decision support systems, new product development, organizational learning, organizational memory, supply chain processes, knowledge dissemination, ontology, engineering design, knowledge management tools, dissemination, information sharing, e-learning, simulation, agriculture, and virtual enterprises.

The above application fields as well as the researchers who have been involved with them are presented in Table 3.

Experienced Systems

Experienced systems are a method of artificial intelligence for gathering knowledge, defined as computational knowledge programs that captivate and accumulate human expertise in specific areas of knowledge. That is why human knowledge must be modeled and presented in such a way that it can be processed by a computer system. Usually experienced systems capture human knowledge in a form of a set of rules. This set of rules in expert systems gives the organization memory by retaining and storing the knowledge of the organization. An experienced system can help decision support processes by asking relevant questions and giving meaning and the reasons for adopting relevant actions. Experienced systems that represent knowledge include knowledge bases, rule-based systems, expert system shell concepts, inference engine, and rule-based justification. Sometimes experienced systems are upgraded using artificial intelligence methods, neural networks, fuzzy logic methods, genetic algorithms, intelligent agents.

Database Technology

A database is the collection of information and its proper organization for effective use in various applications, by concentrating all its volume and minimizing unnecessary, excess (McFadden, Hoffer & Prescott, 2000). A database management system (DBMS) is the software that enables the organization of information, its efficient management,

Table 3. Information and communication technology - applications

Information and communication technology and its applications	
Information and communication technology/applications	Authors
Decision support	Hicks et al. (2002) and Ramesh and Tiwana (1999)
New product development	Ramesh and Tiwana (1999)
Organizational learning	Ramesh and Tiwana (1999), Caraynnnis (1999) and Robey et al. (2000)
Organizational memory	Ramesh and Tiwana (1999) and Robey et al. (2000)
Supply chain	Olin et al. (1999)
Knowledge transfer	Bolisani and Scarso (1999)
Knowledge integration	Fernandez-Breis and Martinez-Bejar (2000)
Ontology	Fernandez-Breis and Martinez-Bejar (2000)
Engineering design	Hicks et al. (2002)
Knowledge management tools	Tyndale (2002)
Information sharing	Chen et al. (2002) and Yoo and Kim (2002)
Law enforcement	Chen et al. (2002)
E-learning	Harun (2002)
Simulation	McCown (2002)
Agriculture	McCown (2002)
Virtual enterprise	Yoo and Kim (2002)

and access to stored information through various application programs. Some of the knowledge management applications implemented with the help of databases are: hierarchical modeling, knowledge refinement, machine learning, error analysis, knowledge representation, finding, ontology, database design, knowledge results, inheritance, geotechnologies, and applications in web applications.

Modeling

Modeling and knowledge management techniques include quantified methods for exploring knowledge, knowledge categorization, knowledge acquisition, learning, pattern recognition as well as artificial intelligence algorithms and decision support systems. Some methodologies are presented as examples of fuzzy logic, including: modeling processes, cognitive process design, pattern language, system dynamics,

decision trees, modeling of knowledge, values, genetic algorithms and programming, intangible assets, modeling, and mathematical modeling by Dekker and Hoog (2000) and Hinton (2002). In Table 4 are presented the above fields and who were the authors who dealt with them.

Policy and Strategy: Knowledge Management Applications

The goal of top management is to motivate and not to exercise control. Its role is to provide strategic directions to enhance learning and ensure the functioning of such learning mechanisms in order to perceive the human potential that it has the capacity more than it believed could and never be totally satisfied with having has been accomplished so far (John Browne, 2001).

In addition, strategies should ensure the need to exploit the “human potential” in a fertile way, as well as being flexible and adaptable so that they can easily change and adopt new ideas.

An important parameter in the implementation of knowledge management is the satisfaction of the requirement for human resource, process and technology

Table 4. Modeling and its applications

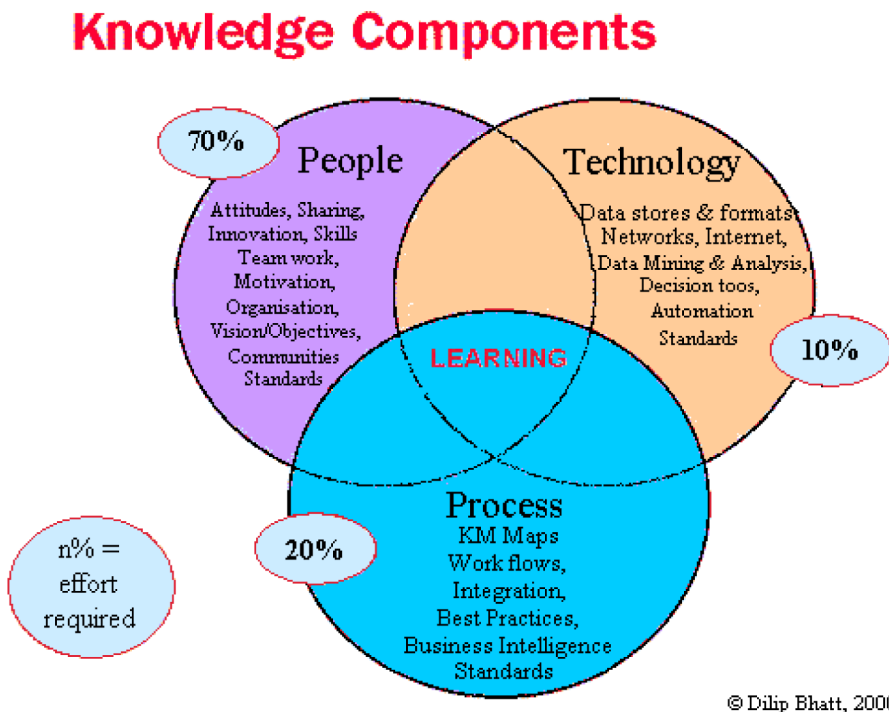
Modeling and its applications	
Modeling/applications	Authors
Knowledge discovery	Maddouri et al. (1998) and Wong (2001)
Knowledge classification	Maddouri et al. (1998)
Learning	Maddouri et al. (1998) and Muller and Wiederhold (2002)
Business value	Hinton (2002)
Pattern languages	Hinton (2002)
Knowledge acquisition	Muller and Wiederhold (2002)
Cognitive modeling	Muller and Wiederhold (2002)
Value of knowledge	Dekker and Hoog (2000)
Process re-engineering	Dekker and Hoog (2000)
Intellectual capital	Kitts et al. (2001)
Intangible assets	Kitts et al. (2001)
Knowledge transforming	Wirtz (2001)

orientation at the same time and not a unilateral orientation to one of these elements. Figure 1 provides details of the sub-elements.

Any implementation of a strategy obviously affects all three of the above, and therefore special attention should be given to the implementation of any strategy, making it necessary for a holistic, general approach that takes into account the design of all the parameters that characterize the above elements. It may be given priority in one of them for ease of implementation, but in any case the parallel development of the rest should not be neglected in order to achieve the goals in the best and most effective way.

Knowledge management gurus argue that Technology represents 10% of the required effort, Processes 20%, while 70% is covered by Human Resources components. Technology is probably the easiest and simplest part of implementation in contrast to issues related to culture, organization policy and human resources that cost more in both time and money. More generally, it is the application of “Start with the young, but it is aimed at the big ones”. In addition, the strategy should address specific application issues, such as awareness campaigns, awareness of the necessary capabilities to optimize knowledge, establish rewards, record requirements and integrate all of the above into the wider administrative program. A more general

Figure 1. Knowledge management and subcriteria



policy should incorporate the introduction of innovation and a culture of learning within the organization, which can be supported through participation in seminars, conferences and educational programs. Assigning initiatives to organize the working time and scheduling of the produced work, depending on the personal potential and needs of the staff, cultivates a less stressful environment, ensuring more favorable working conditions.

In addition, it is necessary to conduct individual checks of the various actions and procedures in order to identify not only possible gaps but also to cross-check information and verify incentives and reasons for doing so, thus saving time from obsolete procedures that are deemed to be abandoned. Finally, the strategy should encourage and encourage staff to develop their individual and personalized capabilities through ongoing training so that a continuous renewal of the organization takes place. This is achieved through communication channels that favor the flow and development of new ideas. Also, the continuous processing and dissemination of information and knowledge, as well as the development of trust relationships between staff and administrators, is a major factor in the success of the company. Separation of knowledge management into individual sub-items easy to manage and implement the “Start with the small ones but aim the big ones”.

Collaborations and Resources: Knowledge Management Applications

The change in terms of a business partnership takes place in the information economy and includes suppliers, customers and even themselves competitors. In connection with corporate services and products, a chain of values is considered as a particularly important element. The dissemination of information and knowledge is a fact that it leads to more apt solutions to consumer issues more quickly. For example, when there's talk of collaborations it is understood a partnership between a bank that offers cars for sale to the public, telecoms and IT companies which develop WAP services, service companies' services that provide the customer with all types of problems, etc.

A necessary element for the successful conduct of such collaborations is the transmission of knowledge between the members involved. The greater the cooperation between the supplier and the customer, the highest quality the product or service provided, as well as the lower the cost. Generally necessary is the provision of an appropriate solution and a proper understanding of the envisaged chain which meets the requirements of cooperation. Through control of knowledge management at an early stage, where, who and how knowledge exists within the body and how it is used while it should be in all parts of the companies and not selectively in some of them. Terms such as B2B which are particularly popular on the market are recommended

to use IT technologies to include upgrading processes, providing knowledge and the transport of services and products where applicable. In order to achieve this, an extensive knowledge check is required to determine the requirements and escalation of human resources, procedures and Technologies.

Human Resources: Knowledge Management Applications

To activate human resources in a knowledge-centric organism is one of the most difficult processes. The required changes are very likely to affect even the beliefs and principles of the organism with the deepest roots. The proposed approach is based on the recognition of individual contributions to the Agency. It has been observed that providing incentives and making changes to the way the business operates from individual staff proposals is causing personal commitment and match this with the agency and makes it a personal matter for its successful course. Maximize its ability and willingness to learn in order to bring about change. Early on, the devotees of knowledge management realized the power of knowledge and the beneficial effect of empowering staff. Most organizations recognized that they are those people who contribute and are the key factor to success, since through them the learning of new technologies, processes and the development of innovative products and services. It is those individuals who can make significant changes in an organism, while it simply acts as a support mechanism.

Moreover, the sooner it can adopt and implement these appropriate changes, the more competitive the organisation becomes and the more sustainable. It is also necessary to give birth and systematically support a climate of trust that promotes the belief that the dissemination of information is a very important factor towards success. The elements of politics and culture which are also related to the structure of the organisation and are important factors for the proper functioning and performance of the organisation are as follows:

- Provision of knowledge and/or direct training related to the procedures, tools and practices of the organisation.
- Ø To reinforce the trend towards experimentation and to provide time for learning new ways of working.
- Development of free thinking.
- Enhancing feedback on the company's performance and issues supported by staff.
- Cultivating an appropriate learning environment that allows staff to act autonomously and improve their skills and an environment which will enhance innovation and the birth of new ideas. Orientation in humans rather than systems. Working groups should be convinced that they can cause

changes in their working environment and not expect the administration to do so.

- Acceptance of failures and exchange of best practices and educational material.
- Key factor is encouraging staff to produce new ideas and innovations. These ideas will be the upcoming services and products of tomorrow, some of them may thrive and others will not, and some of them will arise during the their implementation of highly profitable and other significant competitive advantages.
- Universal and holistic troubleshooting, not full focus on narrow and short-term frameworks.
- Encouraging open communication at all levels of an organization's hierarchy, cultivating a no-blame policy. The establishment of common commitments, objectives and 'language' communication are vital factors in ensuring the movement of information and knowledge within the Organization.
- The employment of staff in appropriate conditions of Trust and Cooperation is the cornerstone of teamwork. Self-controlled groups with certain leaders who can play the role of mentor or in general the person responsible for the team, are key principles for ensuring that the dissemination of knowledge.
- Knowledge and learning are inextricably linked, knowledge leads to education and evaluation. Education far outweighs simple education.
- Free expression of the needs of individuals, groups at the organizational level and external actors, so as to express various alternatives and overcome standardized attitudes. There is no information that is incorrect unless it is characterized by inaccuracy.

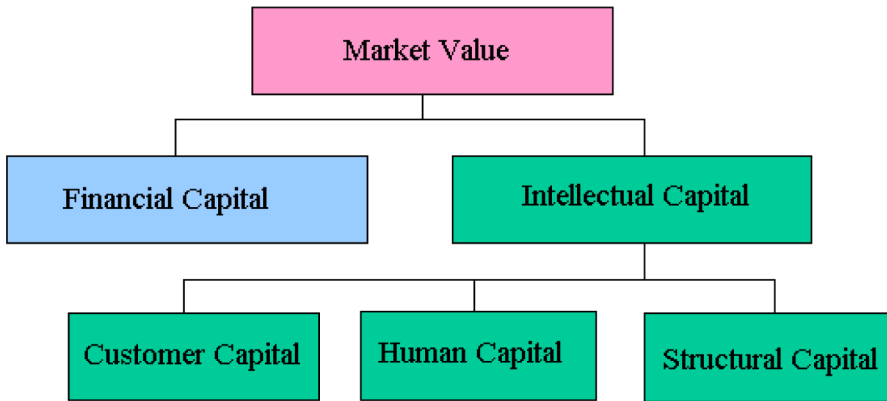
From the above, the multidimensional treatment which should need learning and training procedures is easily understood. There are multiple factors which need to be taken into account, however, in addition to the difficulty involved, it is clear that individual knowledge is a very important profitable value of the market similar to classic economic values Figure 2.

Economic analysts aim to return value of the knowledge of the organisation contained in its staff and which is to be recorded within the annual reports of the agencies. Figure 4 illustrates those elements from which the "Market Value" is characterized.

The continuous development of skills is projected as imperative as customer technologies and demands evolve rapidly, making it adaptability and flexibility in new ideas and trends as an important feature of the "knowledge economy". Organizations that implement knowledge management using the ability of their staff to change and enrich their objectives, develop new standard and procedures and establish and bind

Figure 2. Measures of value

New Measures of Value



adapted from Skandia's value scheme

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“best techniques” to codify knowledge and enable them to practice and procedures. However, caution should be exercised in order not to observe the phenomena of absolute controlling of the body’s function.

It is noted that one of the best practices of dissemination of information is carried out through human communication and interaction. By encouraging dialogue, discussions and top-down communication, and on the contrary at all levels of the hierarchy, the birth of new knowledge and the diffusion of it. It is noted that in many companies, there are assembly areas specially designed for this purpose where informal communication contacts take place.

Organizations are appropriate to incentivize the dissemination of each person’s personal knowledge by rewarding the corresponding act in a similar way, for example in cases where bonus performance is overtime.

A modern market conditions require the redesign of organizational structures and the fact that the successful production of new products is carried out through networks where specialists from different sectors will cooperate within groups, rather than through the current existing common structures. The development of the staff capabilities of an organisation is a very important issue of its policy. Systems, processes and technologies can make conditions capable, but cannot make and bring about changes. Only through the adoption of an appropriate mindset can staff be productive and deliver the maximum of their potential. There is only one way for an

organisation to gain a competitive advantage and it is not to staff with the smartest staff, but to establish more effective communication channels in relation to the other organizations. This is a feature that cannot be copied.

Process Processes: Knowledge Management Applications

In order to determine the involvement of, knowledge management in the procedures, it is necessary to refer first to the Strategy and to identify the following:

- Recognition of procedures involving the strategy.
- What are the requirements for information entry and exit data procedures.
- How procedures become ineffective due to lack of information.
- What needs need to be met to reduce the lack of information.
- Partners and suppliers involved in the various processes.
- Development of a plan for improvements in procedures.

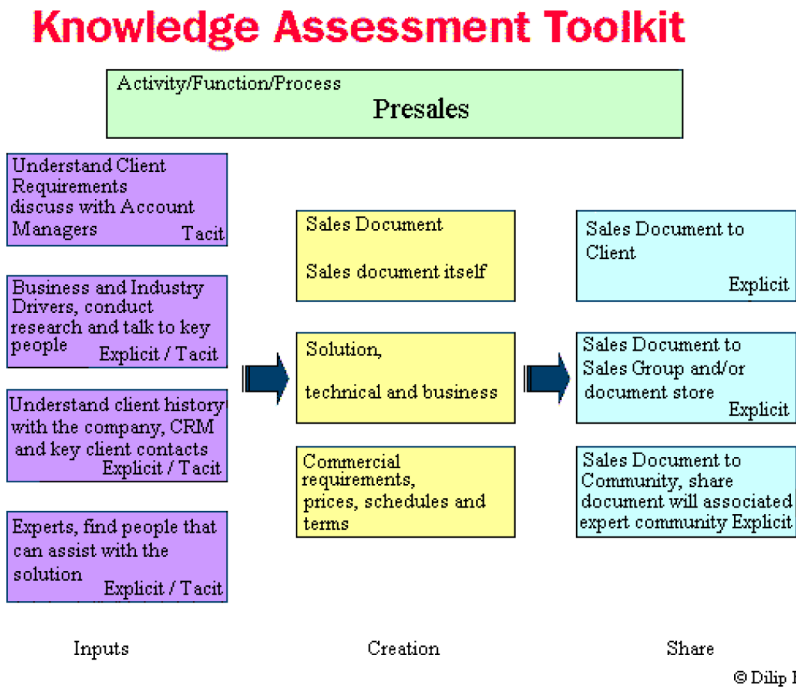
It is necessary to realize that the importance of information is not the same for all organizations and that the information itself is capable of a different interpretation from different people. It depends on the person's status the type of information it needs and the depth and detail of what it seeks in order to be effective provided by the most valid source with the desired data for the best decision. Figure 3 indicates which data can be used to determine the requirements in knowledge at the procedural / operational level.

Knowledge is predicted to exist as a feature in the company's staff, procedures and sources of information at various organizations and local levels. It is presented as a regular and clear knowledge which can have a short or long life. Above all, however, it should have value for the reader, which can often involve difficulties in seeing the value of the supplied Information. The information must be confidential, part of it may be critical while another highly confidential and other openly available. The information is provided through a multitude of sources, forms and means and its ownership is particularly important.

In view of the above, knowledge management should base the following:

- Dissemination, distribution of information, use of it and definition of procedural requirements through the use of the maximum possible information available.
- Need to map the sources of information, the people from whom available, the upcoming public for dissemination, which will help to identify the gaps in knowledge, areas where the information provided is used and not often used,

Figure 3. Data collection - information dissemination



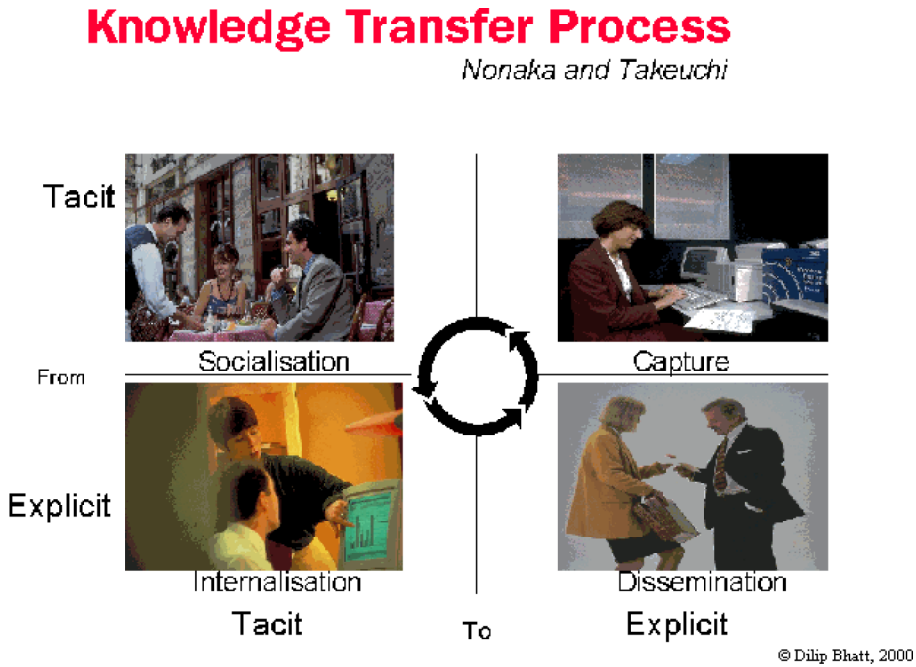
as well as in indicating critical pathways of the course of dissemination and its inventory.

- Optimizing the best techniques, dissemination of ideas.
- Cultivating an environment that promotes learning and improves practical training.
- Optimization in THE and promotion of business intelligence.
- Setting the key factors for the critical of the organisation and ensuring that they are optimized in the context of processes, human factor and Technologies.

Understanding that the dissemination of information is characterized by distinguished elements that need to be recognized and taken into account in the design of the diffusion process knowledge.

Procedures should follow predefined techniques and applications and be compliant with company models and quality systems. In broader contexts using neural networks and databases, companies can now develop new processes and treat for the benefit of new technologies always with the participation of human resources, since only this can act as a reviewer for the selection and use of the above. Finally, recording the knowledge chain will help identify the required procedures. Some parts of the

Figure 4. Knowledge dissemination process



procedures can and should be automated through the use of various technologies. However, any design of procedures and each application requires cost and time to redesign if significant changes are made to the requirements.

Results in Customers: Knowledge Management Applications

One of the requirements that come from knowledge management is beyond the financial data which testify to the most efficient non-progress of a business to other indicators from which its successful course can be indicated. A knowledge-centric organisation of particular importance is attached to the collection of information from the customer as well as with other partners and the exploitation of it in order to support the development of new products and services presented promisingly. Customers can bring over material income to an organization and intangible as they are new ideas and carry market needs by establishing a two-way exchange information between them and an undertaking. An important step towards the commitment of a policy that wants to be characterized as knowledge-centric is the effort to calculate and evaluate all these abstract active elements of an organisation as well as incentivizing workers to trade in so that ideas are disseminated and the development of new services. However, knowledge agencies should, in addition to the

exploitation of detailed information by customers, take action, for example, to take action, for example. on-the-spot visits, observation of the use of products through which this information will be cross-checked. Additional customer satisfaction surveys can act as supporting tools for information abstraction in conjunction with quality management policy.

Results Society: Knowledge Management Applications

The main axes of knowledge management are based on participation and information. The community in general has a requirement that an organisation pursue policies that promote the social interest, which express its beliefs, principles and institutions governing society and operating under environmentally friendly conditions while ensuring the right conditions health and safety for its staff (compliance with rules and laws). It is no coincidence that checks are carried out by competent authorities to comply with the above. In this context, information on regulations, legislation should be given, while cooperation and communication with the competent state and non-state bodies. Finally, companies must disclose parts of their financial data, their progress, etc.

Results in Human Resources: Knowledge Management Applications

In the new conditions of the working environment the basis of the strength of the managers is the relative, relevant level of knowledge. Their role is changing and now they are now called upon to supervise the lower-level organizations but to support them as colleagues. In each organisation other than traditional education and skills development activities, new emphasis should be placed on measurements of the ability and adequacy of usefulness, the value added, dissemination and dissemination of knowledge, customer profile and staff behavior. The new measurements can include elements such as: new proposed ideas, improvements in processes, services and products due to staff interference, dissemination information and acquired capabilities. It is particularly important to grant staff opportunities and ideas on issues that may also escape the narrow contexts of the department; the sector to which they belong. For example, the creator of a new product could also participate in the establishment of its advertising campaign. Everyone should play a pole in the development of a new product and all the necessary resources and means should be provided to further develop an idea. In addition, staff should be in no hesitation in expressing and proposing new plans to their manager and also such actions should be supported and properly promoted.

Key Performance: Knowledge Management Applications

As already stated in the measurements of an organization's performance, particular emphasis should be placed on the assessment of new indicators relating to customers in the procedures of the human resources, technologies by escaping the narrow frameworks for calculating economic aggregates. The above factor ends the analysis of knowledge management application capabilities in the individual factors of the EFQM quality model from which it will then be multiple elements to develop the proposed approach.

CONCLUSION

The presentation of the various knowledge management technologies and applications makes it easy to understand the range of categories and research issues that can be studied and addressed by providing knowledge management tools. The above categorization was based on application domains and methods and technologies used, categories of problems, as well as authors and researchers.

While some technologies have common concepts and types of methodologies, few authors deal with different technologies and applications, indicating that the development trend in technology is also separated by the interests and potential of researchers in the various fields, and therefore the development of knowledge management technologies driven according to the guidance of the experts. Finally, some applications can be implemented using multiple technologies.

REFERENCES

- Anantatmula & Kanungo. (2005). Establishing and Structuring Criteria for Measuring Knowledge Management Efforts. *Proceedings of the 38th Hawaii International Conference on System Sciences*.
- Bhatt, D. (2001). Knowledge management in organisations: examining the interaction between technologies, techniques and people. *Journal of Knowledge Management*, 5(1), 68-75.
- Carlucci, D., Marr, B., & Schiuma, G. (2004). The knowledge value chain: how intellectual capital impacts on business performance. *Int. J. Technology Management*, 27(6-7).

A Mapping of Knowledge Management Techniques and Tools for Sustainable Growth

Chourides, P., Longbottom, D., & Murphy, W. (2003). *Excellence in Knowledge management: an empirical study to identify critical factors and performance measures*. Academic Press.

Dingsøy, T., & Conradi, R. (n.d.). *Knowledge Management Systems as a Feedback Mechanism in Software Development Processes: A Search for Success Criteria*. Norwegian University of Science and Technology (NTNU).

Eppler. (2002). *Fighting Knowledge Fatigue The Role of Information Overload and Information Quality in KM Initiatives*. University of St. Gallen. Retrieved from www.knowledgemedi.org

Gray, G. (2002). *Intellectual Capital Measurement State of the Field*. Cranfield School of Managements Centre for Business Performance.

Gray. (2002). Measuring intellectual assets. *Centre for Business Performance*. Retrieved from www.cranfield.ac.uk/som/cbp/

KPMG. (2003). *Insights from KPMG's European knowledge management survey 2002/2003*. Author.

Marr, B., Gupta, O., Pike, S., & Roos, G. È. (2003). Intellectual capital and knowledge management effectiveness. *Management Decision*, 41(8), 771–781. doi:10.1108/00251740310496288

Marr, B., & Spender, J.-C. (2004). Measuring Knowledge assets-implications of the knowledge economy for performance measurement. *Measuring Business Excellence*.

McElroy, M. W. (1999). *The Knowledge Life Cycle An Executable Model For The Enterprise. Proceedings of the Miami ICM Conference on Knowledge Management*.

Neumann, B. (2002). *The Knowledge Management Forum*. Academic Press.

Paul. (2002). Knowledge Management in Enterprises – Journey to Building a sustainable Competitive Advantage. *Proceedings of the national Conference on Knowledge Management WARE*.

Roos, G., & Roos, J. (1997). Measuring your Company's Intellectual Performance. *Long Range Planning, Special Issue on Intellectual Capital*, 30(3), 413–426.

Sheng, H., & Huang, P. S. (2005). Knowledge management and its relationship with TQM. *Total Quality Management*.

Shu-hsien, L. (2003). Knowledge management technologies and applications—Literature review from 1995 to 2002. *Expert Systems with Applications*, 25(2), 155–164. doi:10.1016/S0957-4174(03)00043-5

Steinruck, S. (2002). Using Knowledge Management to drive business: Organization and Solutions at the Siemens AG. *Proceedings of the Conference INSEAD*.

KEY TERMS AND DEFINITIONS

Data Mining: The actual data mining task is the semi-automatic or automatic analysis of large quantities of data to extract previously unknown, interesting patterns such as groups of data records.

Expert Tools: Designed to solve complex problems by reasoning through bodies of knowledge.


ICT: Refers to technologies that provide access to information through telecommunications. It is similar to information technology (IT), but focuses primarily on communication technologies.

Knowledge Management: Knowledge management is a system that helps people in an organization share, access, and update business knowledge and information.

Chapter 3

Risk Assessment: Knowledge Management Paradigms, Big Data, and Aviation Policy Making

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ABSTRACT

The chapter analyses knowledge management paradigms for the understanding and prioritisation of risks (risk assessment), leading to decision making amongst policymakers. Studies and approaches on knowledge-based risk assessment and, in general, risk management vary depending on perceptions of risk, and these perceptions affect the knowledge scope and, ultimately, affect decisions on policy. Departing from the problems of big data in aviation, the shortcomings of the existing knowledge management paradigms and the problems of data conversion to knowledge in aviation risk management approaches are discussed. The chapter argues that there is a need for transdisciplinarity and interdisciplinarity for greater understanding of context deriving from the challenges in the big data era and in aviation policymaking. In order to address the challenging dynamic context in aviation, the chapter proposes a strength/knowledge-based inquiry that involves public sector and high-power organisations in order to gain holistic knowledge and to aid the decision analysis of policymakers.

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INTRODUCTION

Disasters that affect the public receive a lot of attention about what went wrong, and who is responsible. Such disasters can be financial (e.g. the 2008 economic crisis), physical (e.g. the 2004 and 2011 Tsunamis), or industrial (e.g. the Ethiopian airlines crash in 2019). In aviation, disasters (fatal events) are now considered exceptions, as the safety record has reached its most impressive statistics. Specifically, the safety record has had its zero-accident year in 2013, and industry reports note the developments in the industry as “downward trends” (IATA, 2015). In addition, Airbus’s (2014) statistical analysis shows that fatal accidents chances are 0.07 in one million flights. Moreover, ICAO (2014) notes that, compared to the growth in traffic, there is a decline in accidents, noting a 2.8 accident rate per one million departures. This relatively ‘accident free’ context, however, is not without challenges. Knowledge challenges in aviation safety are noted as information is “hard to calculate” (Allianz, 2014). In addition, recent accidents shifted the attention to sabotage (e.g. Germanwings 2015), conflict zones (e.g. the downing of MH17), the role of satellite tracking (e.g. the disappearance of MH370), and to issues of cyber security (EASA, 2016). Recently, the Federal Aviation Administration (FAA) came into the spotlight of controversy when two Boeing 737 MAX¹ crashed killing all souls on board. The public, experts and other stakeholders of the aviation industry question the role of the FAA in the certification process of the new Boeing, whilst looking for answers to the fatal crashes. In this dynamic environment, the aviation policy makers highlight context as part of the emerging issues in aviation safety (EASA, 2015), which affects knowledge elements (Theocharis & Tsihrizis, 2016). This chapter emphasizes on the changing nature of safety and risk in a big data era, and raises questions for the development of knowledge management in the risk assessment process. In particular, the chapter discusses the conversion of data into knowledge and that this conversion process depends on risk management paradigms. The chapter advocates the need for an alternative knowledge paradigm for risk assessment in aviation, able to assist in strategic planning and decision analysis. The following sections review the literature and the problems in the knowledge management (KM) paradigms, and as these are applied into aviation risk management (RM) methodologies. By doing so, the chapter explains the problems under each paradigm for the conversion of data to knowledge and proposes an alternative, multiparadigm, approach for risk assessment through learning.

BACKGROUND

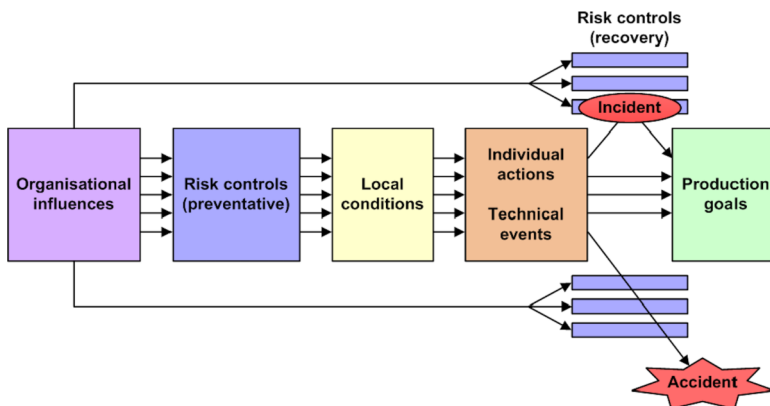
Risk can take various forms from financial to reputation and environmental, whereas flight safety risk specifies the risks regarding the safety of an aircraft's occupants (ARMS, 2010). Similarly, Janic defines risk as "the possibility that an individual or group be impaired through the effects of specific actions in a more or less random manner (2000:43). Due to the improvements in the safety record of the industry, the attention is shifting to serious incidents and learning. For example, the Asiana crash landing in 2013 (NTSB, 2014) was related to issues of automation complexity, and lack of adequate training and experience in manual handling of the aircraft. Such incidents indicate that safety problems should not be (merely) targeting traditional risk assessment, but in light of the changes in stakeholders, such as the pilots' profile, the role of technology in safe operations, and the changing context (e.g. new business models, career paths, competition etc.). According to the European Cockpit Association (2013), key issues with regards to safety, and that have to do with human performance in aviation operations, are fatigue and training. The challenges noted in the ECA's (2013) safety plan incorporate these two issues (i.e. fatigue and training) and extend these to the problem of inadequate regulations and safety culture. For the further prevention of fatal accidents, both proactive and reactive approaches are highlighted in the literature (Oster, Strong & Zorn, 2013). A proactive approach focuses on the identification of emerging risk factors (Clinton et al., 2013). Similarly, risk assessment is identified in three modes of risk proactive, real time and retrospective (Hardy & Maguire, 2016). Real time data means real time collection (delivery) leading to data 'banks'. Data banks host big data, which can come from various sources, such as the aircraft itself and air traffic control management systems. However, whilst big data seek to find new discoveries, they come with challenges (Fan et al., 2014). The challenges in aviation include data availability (Li & Ryerson, 2019), their analysis (Arkekar, 2014), and quality (Saha & Srivastara, 2014). Most importantly, it is the risk philosophy that underpins the process and indicates what kind of data is collected and analyzed and, and hence what decisions are being made.

Most of the knowledge the aviation community holds derived from retrospective analysis of occurrence, meaning, for example, accident investigations. Such analyses have produced hard, statistical data, and a focus on quantitative inquiries. As shown in Figure 1, accident investigation authorities acknowledge only some wider, organizational aspects in disasters (identified as an effect just before the production goals in Figure 1). The linear thinking shown in Figure 1 dictates for measures and actions (called risk controls) to minimize and mitigate risks. According to this approach, accidents occur due to inadequate risk control. The approach, due to its quantitative and quantifiable nature (also see Figure 2 for examples of hard data

sources), has formed the basis for a great number of aviation safety studies and has produced several models and tools, that are beyond the scope of this chapter to analyze. Under this approach, the impact on the industry and its advances were significant through safety metrics, what is known in organizations as key performance indicators (KPIs).

Along this risk control and safety metrics rationale (Figure 1), the European Aviation Safety Agency (EASA) highlights hazard identification as part of safety-risk assessment, noting that the terms are not definite (2009). A hazard is identified as a condition that may be existent or is possible to exist and can potentially affect an outcome (Green, 2008). Accordingly, risk assessment is part of the risk management process (Figure 2) and involves the prioritisation and understanding of risks and their effect to safety and requires a lot of data (Hadjimichael, 2009). Risk assessment analyses the risk in terms of two elements: severity and probability, where relevance and priorities, as well as the significance of risk is the focus (Hatvani, 2015). For example, IATA (2015) assesses the safety record of the industry by looking at fatality risks and specific phases of flights, such as runway excursions, control flight into terrain² (CFIT), and mid-air collisions as part of the “significant seven³” risks in aviation (CAA, 2013:4). The focus, then, is on the assessment of data (and the lack of) that can serve as the basis for understanding risks, in order to develop risk barriers and risk mitigation practices, since it is difficult to adequately assess the result of a hazard in terms of consequences and impact on the system (Green, 2008). The mitigation measures in turn are identified as risk barriers and form the risk control system in place (EASA, 2009). The escalation path of hazardous scenarios are threats (Green, 2008), or risks (CAA, 2011; FAA, 2011), and consequences (Guldenmund et al., 2006). The consequences are identified as incidents or accidents. Safety management strategies, hence, focus on risk areas that are high in fatality rates (e.g.

Figure 1. Accident transportation safety board (Underwood & Waterson, 2013)



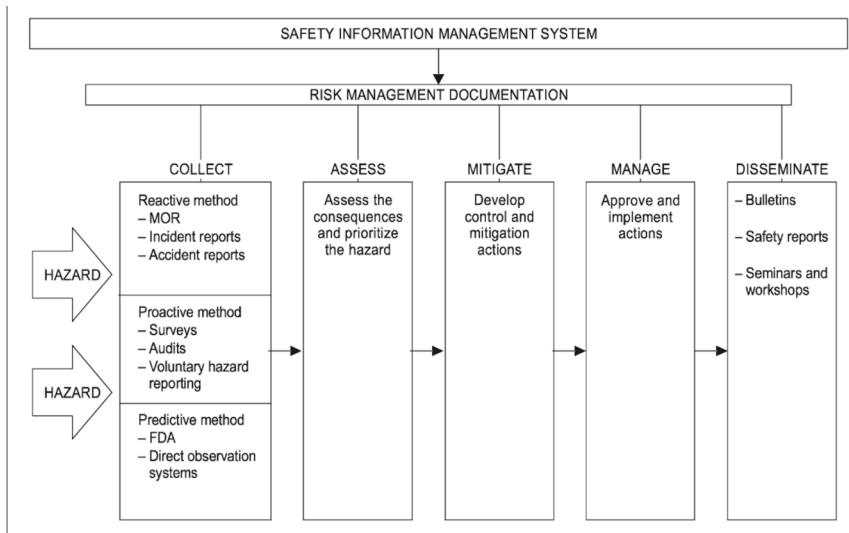
Risk Assessment

CFIT) and in frequency (e.g. runway excursion). The scope of the system, then, is the first step in risk assessment as it affects the whole analysis (Figure 2). Based on the scope, scores (in risk matrices) indicate whether a risk can be acceptable because it has minor severity and/or is highly improbable to occur.

However, aviation is an industry that has entered a big data era, and despite the advancements there are certain challenges for knowledge management deriving from the big data scope. In particular, Li and Ryeserson (2019) find that, although there is an increase in data sources, there are problems of data availability and data collection. Positivist approaches have also questioned the reliability of risk-based decisions, proposing modelling softer factors such as the beliefs of the decision-maker about what constitutes reality (Gardenfors & Sahlin, 1982). Other criticisms involve, risk and knowledge and how not knowing (enough), and lack of deep knowledge create a new risk (Sahlin & Persson, 1994). Hence, the scope is the focus of this chapter and how this scope of analysis is affected through the risk philosophy which in turn highlights the scope of knowledge. In detail, the chapter focuses on two aspects of RM and KM, a) as part of the decision-making of policy makers, and b) as an issue to be addressed that is affecting knowledge. Although risk assessment has traditionally been only a part of the decision-making process, there is also the field of risk-based decisions (Dubois & Guyonnet, 2011). Therefore, risk assessment is positioned in the policy making process (Aven, 2016). The chapter shows how the philosophy about risk and safety in aviation is affecting part of the knowledge management process (Soo et al., 2002), and in particular, with regards to a) sources of data, and b) uses of data (problem solving/decision-making). Specifically, elements of the decision-making process, such as quality of information and the amount of information (Gardenfors & Sahlin, 1982) are affected under the dominant risk philosophy in aviation (Figure 2).

Because of the public interest involved in air transportation, stakeholders of the industry are involved in and/or can influence knowledge, decision analysis and policy making. The knowledge management process in aviation public sector organizations is hence influenced by the interrelations within and between the organizations. Studying these in isolation creates knowledge gaps and possible unidentified risks. Due to the stakeholders' interrelations and cooperation, the prioritization of risks can be affected depending on how risks are perceived in the aviation community. For example, the risk assessment process in aviation focuses on calculating probability rates of a) accidents and b) fatalities (Janic, 2000). This chapter argues that this approach creates problems in gaining and managing knowledge in the industry, and in the decision making of its regulators. Knowledge Management, then, is linked to philosophical stances, perceptions, about risk. Hilgartner (1992) calls this process, risk objects, meaning that, risk perceptions are reflected in the actual developments (objects) of a system. In the public sector these risk perceptions and the knowledge

Figure 2. The risk management process (ICAO, 2013)



management paradigms that underpin them are important because: a) the policy making process is, as explained, by default complex, and b) public policy issues are the result of focus in the society that constructs the risks (Klinke & Renn, 2002). It is, hence, seminal to initially examine the paradigms of KMAs applied in aviation, and then identify the problems in the creation and conversion of data into knowledge.

AVIATION RISK, SAFETY AND KNOWLEDGE

Risk Assessment and Knowledge Management Paradigms

The view of reality and of the world is what drives approaches, critiques and debates (Barlas & Carpenter, 1990). Approaches to system failures led to the formation of accident causation looking for underlying factors and therefore explanations for human actions and errors. The methodologies in the aviation industry are summed into the sequential, the epidemiological and, the systemic ones. Sequential models in the risk management field take the closed-system approach and examine causes in sequence. Due to their lack of examination of the effect of the wider environment such analyses are narrow, examining linear relationships that are validated in an objective manner. For example, reductionist/logical positivists view a model as valid when it is correct and thus, when it deals with the empirical data to identify the model as true or false (Barlas, 1996). The epidemiological approach sees accidents as the

Risk Assessment

result of an organizational disease (epidemy), and hence the analysis here aims to be broader, examining not only causes but also contributing factors (latent factors). Lastly, the systemic lens allows for analysis and mapping of broader systems, and the depictions of relationships between systems (feedback loops). The latter two approaches, the epidemiological and systemic ones, can be found to be used as the same view (Underwood & Waterson, 2013), although system thinkers attempt to detach themselves from being successors of cause and effect thinking.

The paradigm, therefore, defines the researcher's view and the methodological choices following certain assumptions about reality and implications for the research (Guba & Lincoln, 1994). As a result, the facts derive from a theoretical framework which, when altered, alters the facts (Guba & Lincoln, 1994). In Knowledge Management wisdom (the ultimate level of the knowledge hierarchy) stems from data – facts (the lower level of the knowledge hierarchy), and hence the importance of data is highlighted in risk assessment (Cong & Pandya, 2003). In aviation, knowledge data are usually pilot performance, risk and safety data, fatalities and their probabilities, weather and technical data (Li & Ryerson, 2019). Their quantification and risk assessments in terms of probabilities remain in the centre of aviation risk management. However, and despite the lessons learned (knowledge), accidents that could have been avoided were not and past accidents reoccurred. For example, past accidents were attributed to pilot pressure in the 1958 Albuquerque crash, and these types of accidents reoccurred in the following decades (e.g. the Nation Air crash in 1989, Accident Prevention, 1993), as well as more recently (i.e. the FlyDubai crash 2016, Interstate Aviation Committee 2016). In addition, fatigue- and training-related accidents kept occurring (e.g. Colgan Air 2009, NTSB, 2010), and still are (e.g. Ethiopian Airlines 2019). Through these events pilot error taxonomies and organisational conditions that led to accidents and incidents played a major role in gaining knowledge for aviation safety (Wiegmann & Shappell, 2001). In that sense, then, risk perspectives are based on perceptions about accidents and their causes (Reason, 1990).

The way risk and data are perceived and ultimately transformed into knowledge, however, is important. This process is called knowledge conversion (Haltiwanger et al., 2010) in the knowledge hierarchy (Sağsan et al., 2016). Risk analysis in RM and decision analysis in KM showcase the differences in perceptions. Table 1. below summarizes the key paradigms in KM and the equivalent approaches in aviation stemming from each paradigm and used for risk assessment. For the purpose of indicating the KM gaps in the aviation risk assessment process, three out of the four paradigms⁴ by Sağsan et al. (2016) are useful. Specifically, Table 1 shows that the approaches in KM and in aviation RM have common philosophical roots. For example, the Swiss Cheese Model (Reason, 1990) theorizes how an accident occurs when the failures in the organisation (holes metaphorically) align. Similarly, linear systems

models focus on objectivity and measurements of errors, problematic behaviors and so on. More complex models are those that are based on the socio-technical paradigm (socio-technical systems in the aviation safety literature) and focus on the analysis of the interactions (communications) between systems and how then wider levels of a system contribute or lead to an event. Therefore, Table 1 shows the parallel key paradigms in KM and in Aviation RM. This indicates that there are different perceptions of risk and how these are measured, assessed, and managed. Hence, the wisdom depends on what one is looking to find (Hollnagel, 2006:6).

Based on the knowledge paradigms in Table 1, Table 2 shows what knowledge develops from what data and that, for that reason, prioritization is affected by the scope of the analysis. Specifically, Table 2 presents the transformation of data to the wisdom acquired depending on the paradigm. By doing so, Table 2 highlights problems that lead to knowledge gaps and incomplete risk assessment, which ultimately affect the decision-analysis and -making of policy makers. For example, under the humanist paradigm and the emphasis on objective reality (known as hard systems thinking), statistical feedback is discontinuous since adverse events are rare (Herrera et al., 2009). It is also indirect feedback because statistics are incomplete snapshots of safety and do not focus on providing the system’s response to hazards (Reason, 1998). Similarly, for pilot error Dekker notes that “data is not something absolute...data about human error is infinite” (2002:98). Moreover, pilot-error statistics fluctuate over the decades. For example, a decrease was noted for the years 1979-1985 and an increase between the years 1986-1989 (Oster, Strong & Zorn, 1992). Therefore, statistics can indicate a trend, but they lack explanatory and in-depth value. Nevertheless, they indicate patterns that aid contextualisation and highlight research needs.

Table 1. Knowledge management paradigms in aviation

	Knowledge Management	Approaches in Aviation
Inter/intra Organizational	<ul style="list-style-type: none"> • Management Theory. • Organization Science. 	<ul style="list-style-type: none"> • High Reliability Theory (leadership, safety culture, engagement). • Swiss Cheese Model (failures are triggered by organizational factors).
Humanist	<ul style="list-style-type: none"> • Objectivity. • Psychology. 	<ul style="list-style-type: none"> • Domino model (blockage of dominoes). • Linear systems (error management). • Man-made disasters.
Socio-technical	<ul style="list-style-type: none"> • Communication. • Sociology. 	<ul style="list-style-type: none"> • Normal Accidents Theory (focus on tight and loose coupling of systems). • Systems Theoretic Accident Model and Processes (focus on non-linear dynamics).

Risk Assessment

However, hard data can lead to overconfidence. For example, in aviation, industry stakeholders talked about a golden age in aviation safety going platinum due to the results in the annual reports about the safest year in aviation being 2017⁵. This is what Reason (2004) states as risk blindness when the belief is that the past non-events mean future non-events. In systems science polarities have been characterized as “dangers of corporatism” to reflect the micro level focus, “totalitarian directions” (Trist, 1981) and “specialised deafness” to reflect the battle of disciplines (Boulding, 1956). Similarly, Meadows discusses selective blindness in the models’ methodological roots (1980) and Guba and Lincoln characterize objectivity as naïve realism (1994). Specifically, in aviation, risk modelling is based on historical patterns, but considering the environment static, and what is characterized as *context stripping* (Guba & Lincoln, 1994). The implications for research are flaws due to the lack of contemporary information, the failure of problem detection and the over-confidence in quantitative models. The argument here is the emphasis on mathematical models rather than on human judgment (Angius et al., 2011), and that issues are missed. For example, Barnett’s research in 2000 examined passenger risk in different countries and found that the safest nations are those of the first world economies such as the USA. Barnett’s research was followed by the tragic events of 9/11. More recently, ICAO (2010) noted the rapid growth and predicted a further growth in Malaysia by 2012 illustrating the excellent safety record of the national carrier, Malaysian Airlines. In March 2014, its missing passenger jet marks the Malaysian Airlines’ safety record. These are indicators that the industry is in need of constant learning and knowledge from holistic sources of data. However, this does not mean that the improvements are not important, but that they highlight the need for further monitoring and assessment of the new context.

Under the intra-organizational paradigm in Table 2, data comes from reports and audits. Auditing systems and the reporting of occurrences and other safety issues can be voluntary or mandatory. Specifically, the reports are safety indicators at the organizational level (Herrera et al., 2009) and emphasize the use of existing

Table 2. Data –to- knowledge problems

	Data to Knowledge	Problems
Inter/intra organisational	<ul style="list-style-type: none"> ● Incident reports. ● Audits. 	<ul style="list-style-type: none"> ● Lack of data. ● Regulatory capture. ● Punitive culture.
Humanist	<ul style="list-style-type: none"> ● Statistical feedback. ● Pilot error. 	<ul style="list-style-type: none"> ● Discontinuous data. ● Fluctuations. ● Overconfidence.
Socio-technical	<ul style="list-style-type: none"> ● Sense-making. ● Strategic. 	<ul style="list-style-type: none"> ● Disregards change. ● Difficult to implement.

information systems while new hazards emerge (Leveson, 2003). The reports are considered a qualitative, yet quantifiable, source of data and a barrier since, by focusing on hazards rather than incidents or accidents, weaknesses are brought forward (Wincher, 2013). These can be used by various groups, including flight and ground personnel, supervisors and managers. Recent improvements to the reporting systems include the non-punitive policy (CAA, 2014). In addition, the systems that are currently used worldwide have increased to 13 different ones based on the Aviation Safety Reporting System by NASA (Wincher, 2013). However, there are limitations in the reporting systems and their overall impact on knowledge. For example, the design of these systems includes categories and classifications of errors or risk situations that mostly derive from authors that have developed a model for accident analysis. Therefore, these reports reveal too little and too late (Reason, 1993). Moreover, factors such as organizational climate and supervision are vaguely identified (Beaubien & Baker, 2002).

Examples include the Aviation Safety Reporting System (ASRS), initiated by NASA and the FAA in 1976, which revealed 2860 reports per month (Loukopoulos & Dismukes, 2002). However, the content and the number of the reports do not give in-depth insights to the issues raised. In the UK specifically, the voluntary reporting system is the Confidential Human Factors Incident Reporting Programme (CHIRP), which has certain limitations since it is not clear to pilots how to use the system (Beaubien & Baker, 2002). Moreover, the British Airways' Safety Information System (BASIS) in cooperation with Airbus (Speyer 2004) and the Line Operations Safety Audit (LOSA) have similar limitations since there is a lack of clear descriptions with regards to processes (Beaubien & Baker 2002). In other words, the why in these reports is voluntary (Speyer, 2004). Therefore, the data deriving from these systems reflect the input and are limited to those in value (Rothblum et al., 2002). Moreover, incident reports include too technical information (Luxhøj & Maurino, 2001). Lastly, serious incidents have been unreported in the past until a Command Leadership and Resources program was introduced in United Airlines (Wise et al., 2010). Therefore, the presence of the tools does not mean the tool's use, and the number of reports is not reliable either to showcase knowledge of the state of the systems.

Moreover, in audits by regulators, the problem of regulatory capture affects the data and their conversion to knowledge. Regulatory capture is the term that characterizes a dependence relationship between a government body and the industry's stakeholders and is affecting their decision making. The safety regulators for audits and the certification of new aircrafts and operations have been heavily criticized. Historically, regulations have been argued to be biased by technological grounds and management modes (Rasmussen & Batstone, 1989). Similarly, more contemporary criticisms are mainly due to the fact that the regulators are aiming to

Risk Assessment

increase operational flexibility (Gander et al., 2011). In addition, there are differing views of risk and safety amongst stakeholders of the industry, and there are conflicts between aviation professionals (i.e. pilots) and policy makers (i.e. EASA). The FAA has been, therefore, accused several times for their relationship with operators and being ‘captured’ in these (Niles, 2002; Thaw, 2014). Recently, the FAA and market powers were blamed for the speedy and ineffective certification process for the aircraft by Boeing, the 737 MAX (Economist, 2019). In addition, several auditors can be employees of the organization being audited (e.g. part-time pilots). Hence, in this environment power relations can develop (Papanikou & Veersma, 2012).

Due to the shortcomings of the models of the humanist and organizational paradigms, scientists aim to assess whole systems in order to gain knowledge and propose risk assessment solutions and recommendations. Under the socio – technical paradigm, models look for interactions (communications and feedback loops) amongst systems that can show possible risks and their severity, as well explain what went wrong. The problem under this paradigm is the inflexibility of the frameworks to account for broad and multi-agent changes. For example, there is a shift of responsibility from the regulator to the organisation and the individual, through management systems at the organisational level. Such lawful deviations from safety standards have been praised as successful implementations by carriers such as Easyjet (Gander et al., 2011) but also as remote pathogens of the safety system (Bennett, 2004). In other words, management systems focus on normative procedures and technical details. Another responsibility shift is the move of compliance with reporting aspects to the airlines rather than to regulatory institutions and associations. However, attempts to discuss safety concerns have been addressed by certain air carriers with a suit towards the pilots’ union. Therefore, there are regulatory barriers to reporting adverse events and financial disincentives such as losses in terms of reputation, jobs, resources and profit (Barach & Small, 2000).

The guardians of safety (e.g. safety managers, regulators) as a panopto-like tower (Foucault, 2008) observe and safeguard safety from a ‘disease’. External regulation, then, defines legal responsibility (Grote, 2012) and Knowledge Management in public policy organisations, such as the FAA and ICAO in aviation, adds value to the process as it shows accountability in their decision making through the mitigation of risks (Riege and Lindsay, 2006). Control, then, has become the norm when it comes to safety management. Similarly, in health care settings, researchers observe the hegemonic power of accepted reality (Cheek & Rudge, 1993). However, their decisions stem from what their partners (stakeholders) in the industry provide as data. Information can be provided making use of the safety management systems (SMS) in airlines, meaning the corporate management responsibility and the company policies with regards to safety and how this is achieved (CAA, 2002). SMS aim to address the human element of the system and focus on aviation hazards

and unwritten risks (Remawi et al., 2011). Therefore, SMS is also identified as an emphasis to systemic management rather than a corporate level programme (Hsu et al., 2010). However, these structural modifications in the system such as SMS, and the focus on airline management, can be problematic because knowledge from SMS is based on the inherent subjectivity of the operator (CAA, 2002) of risk assessment by the airlines. The subjective element is affected by cost pressures and disincentives. Specifically, the management approach does not consider the forces acting on organizational decisions, but also industry and market wide. Moreover, such initiatives view accidents as organizational whereas a wider environmental scanning is absent.

In summary, therefore, Table 2 indicates the overarching three key problems in risk assessment that lead to knowledge gaps: a) the problem of quantitative data and statistical analysis over the years, b) the focus on error, and c) the emphasis on an ultra-safe system; over confidence and over reliance on past successes. These are problems because they enhance risk blindness. Risk blindness is increased due to: a) the retrospective focus deriving from past quantitative data and causes of accidents, b) the pilot error problem leading to micro level focus and analysis, and thus c) the assumptions that no changes have been made in other systemic components. The risk philosophy, then creates problems in the process of knowledge management, in terms of sources, uses and outcomes. In detail, and according to Soo et al (2002), sources of information built the knowledge base, which in turn influences the quality in decision making, and ultimately the outcomes (innovation). It is proposed that breaking away from a hegemonic risk philosophy, can aid to be less risk blind. As McAdam and Reid (2000) note, public policy is heavily influenced by social interactions, from which knowledge derives, and propose social constructivist approaches. Therefore, what is ‘missing’ in paradigms that creates knowledge is one that is able to identify and analyze the network of stakeholders of the aviation domain and affects the phases to policy making. Based on this gap, there is a need to understand the complexity of the system and its actors, the role of regulators in the decision-making process on policy making and the implications for knowledge management in learning loops of systems.

SOLUTIONS AND RECOMMENDATIONS

As discussed under the humanist paradigm, hard systems thinking aims to manage uncertainty by measuring and controlling what is considered true. To this end, hard system thinking focuses on problems of control and of prediction (Jonas, 2014). However, as Mingers (1997) posits, public policy issues and social order changes need a complementary approach. Systems and knowledge are, hence, “ultimately

Risk Assessment

conceptual constructs, and as such contemporary systems approaches can be regarded as belonging to a constructivist tradition” (Reynolds & Holwell, 2010:7). It is proposed, then, that reality is viewed as a process and not as a ‘thing’ (Pidd, 2004). To Checkland (1985), this process is one of learning and the system is the learning vehicle. Reality is a process of participation and reification amongst members of a community (Turner & Tennant, 2010). To this end, the chapter proposes a strength-based inquiry based on critical interpretivism explained below.

Soft systems methodology is an action-oriented process of inquiry, where the models are used as the source for asking questions (Checkland & Poulter, 2010). Checkland (2000) views hard and soft methodologies as stances, and notes that systems thinking should reflect a paradigm shift from hard to soft thinking of systems as a learning vehicle. Soft systems thinking is, therefore, concerned with interpretivist, human activity systems, multiple perceptions, philosophies, values and diversity in beliefs in order to reach mutual understanding (Checkland, 1985). Constructionism focuses on construct-driven knowledge and consensus of that knowledge amongst those that are able to construct it (Guba & Lincoln 1994). Indeed, Patton (1975) stresses that hard data to scientists are, in most cases, useless to practitioners who need context related research, meaning and understanding of operations. For example, Turner and Tennant (2010) find different constructs of safety, risk and accidents in military operations. In particular, Turner and Tennant (2010) note that safety is a complex construct that takes different meanings amongst members of the military community (e.g. the Ministry of Defence and the Royal Marine Commandos). However, following soft systems thinking in a normative way, can exclude cultural and power aspects of system studies. Different questions, contexts and uses require different ways of thinking (Reynolds & Holwell, 2010).

At the other end of positivist approaches, emancipatory, discursive, and thus subjective, approaches view the world as a moving ground affected by power and are much more abstract and difficult to analyze (Daellenbach, 2001; Stahl et al., 2003). The limitations of those research streams include: a) inadequacy to capture solutions and to address the complexity of socio-technical systems (Marais et al., 2004), b) are quite subjective and c) are based on loose structures (Debrincat et al., 2010). However, changes in the regulatory bodies’ structure are noted. Specifically, in Europe, there is increasing fragmentation as each national authority indicates to EASA how it maintains safety standards without necessarily following the safety recommendations of the agency (Gander et al., 2011). This increased fragmentation creates “vertical empires” (Bennett, 2004:34) and results into policies not being mandatory inconsistently. For example, the FAA notes that SMS implementation is not compulsory for US airlines (Hsu et al., 2010). As in risk management, KM issues span to culture, organizational aspects, philosophy and hence are need of different research approaches (Ibrahim, 2017). It is perhaps for that reason that

both KM and RM illustrate complexity in terms of disciplines and where they 'sit' in the literature. For example, as discussed in this chapter, the philosophy of risk can affect what knowledge will be gained on certain aspects. As data lead to knowledge (conversion), what is considered 'true' formulates the knowledge base (Aven, 2016). Knowledge deriving from hegemonic stances can be affecting in turn what is identified as risk and how the risk object is created. In other words, the risk-based decision making and how risk is perceived affects the knowledge management components (Soo et al., 2002).

Critical thinking is the approach of multiple paradigms (Mingers & Brocklesby, 1997) trying to reveal subjectivity, distortions and self-deceptions (Cooper, 2003). Critical system thinkers (e.g. Simon 2009, Ulrich 2003) address the shortcomings of hard approaches and the need for context specific research, including politics, culture, inequalities and power issues. For example, Power et al. (2009) study risk management as an organisation logic to reputational risk and the defensive struggling of management. As Mingers (1997) notes, multi-methodology enhances one paradigm (i.e. soft- social constructionism) with techniques from another (i.e. power - critical systems thinking). It is then proposed that critical thinking complemented soft approaches following critical interpretivism. For the collection and managing of appropriate knowledge, critical interpretivism allows for the emergence of conflicting views that challenge the social order and public policy issues (Daellenbach, 2001). Therefore, theoretical integration of frameworks and practical points while understanding various aspects is a more three-dimensional image (Törner, 2011). The needs of a learning process, then, mean that elicitation is key for the use of expert judgment, as communication amongst experts and researchers affects the process (Skjong & Wentworth, 2001). For this reason, the researcher proposes that a strength-based approach would add several advantages to the traditional problem-based inquiries.

Appreciative Inquiry (AI) is strength-based approach that views the organisation as an open system (Cooperrider et al., 2003). In detail, AI is a participatory, learning - oriented approach based on the philosophy that positive inquiry focusing on best moments and assets aids success in change programmes, quality management, and evaluations (Cantore & Cooperrider 2013; Coghlan et al., 2003; Cooperrider & Whitney, 2001). Hence, in line with AI principles, the theme of the inquiry should be positive, provoking experts to think about data and knowledge, how it should be and how it is now. Based on the constructivist principle (Cooperrider & Whitney, 2001), AI is the means to generative, collective knowledge (Bushe, 2007; 1999), raises questions, and challenges taken-for-granted realities (Bushe, 2011). Advantages of the use of AI are found to be mostly on large and complex systems (Reed et al., 2002), like public organizations and high-risk industries. Through AI, problems can be addressed as being reframed into strengths and positive change (e.g. what else

Risk Assessment

one wants more from their organisation). This helps participants discuss systems, which are complex and a polarisation between problems and appreciation may not be appropriate. Positive stories and images through the use of vignettes through the nature of the questions (e.g. three wishes about aviation) can be used for the appreciative approach of inquiry. This can lead to thick descriptions of systems.

In accordance to Bushe (2007), then, the use of AI is generative by revealing ideas, new models, and theories identifying ways forward in terms of knowledge management. Considering the AI process in an expert group, the philosophy of AI and the affirmative topic makes a contribution in learning. In more detail, the appreciative theme and question set the tone of the whole process. In line with Cooperrider and Whitney (2001), this practice shows the power of the positive topic. In addition, Knibbs et al. (2010) document that the use of AI as a philosophy benefited their group process, where equal voice and a great number of ideas are noted. Furthermore, Michael (2005) finds supportive evidence for the advantages of appreciative interviews, namely eagerness to share stories, dynamic information, and less defensiveness in discussions. As Soin and Scheytt (2006:23) find, stories “are able to depict the dynamic and transformation aspects of evolving societies”. Moreover, Bushe (1995) finds stories as the most important information in appreciative interviews and can include past, present and imagined futures (Whitney & Cooperrider, 2000). However, participants can lead the discussion outside the appreciative mode in order to identify the system ‘as found’. In particular, appreciative questions such as “what is going well” and “why is it going well”, lead to areas that are in need of transformation (Coghlan et al., 2003). In addition, the appreciative tone of the discussion is useful as best practices were linked with improvements and change programmes (Seeger, 2006). Lastly, appreciative interviews with policy makers can focus on applications, and challenges between data and their conversion to knowledge. However, this does not mean that quantitative or functionalist approaches to systems should be disregarded. For example, quantitative models used are more appropriate for later stages of the risk management process (to EASA’s stages of the safety assessment methodology aviation risk models, mostly address the risk factors), such as in the implementation stage, where boundaries are narrower, and accuracy needs to be tested (Meadows, 1980).

FUTURE RESEARCH DIRECTIONS

In the current era of bigdata, knowledge management challenges have been discussed, and in particular the challenges that affect the transformation of data into knowledge (conversion) and into policy. The challenges of lack of data in aviation and data unavailability, lead the industry to question where the learning will be coming from,

what kind of data is needed, and how the lack of data is affecting policy making and other high-level decisions. Due to the nature of the problem, interdisciplinary research should become more promising in risk and in knowledge management, as there is a need for greater open dialogue amongst stakeholders. Interdisciplinary research, it is suggested to explore the usefulness of alternative paradigms for further developments. In addition, trans-disciplinary research is suggested, where the dynamic, multifactorial and “network-centric” methodologies are found (Leischow et al., 2008). To this end, the issue of power relations, and how a complex social network affects knowledge should be addressed within industries and researchers should examine the effect of power relations to policy makers’ knowledge management and their decision-making. It is, therefore, suggested that holistic studies and mappings of interactions are deployed in order to help describe the power relations and how, then, knowledge hubs are created or are challenged. This chapter proposes a critical interpretivism approach using Appreciative Inquiry in order to manage the problems in the conversion of data into knowledge, in the risk assessment process, and aiding policy making. Furthermore, it is suggested that future research examines knowledge management philosophies in cross regional and cross-sectional studies. For example, differences amongst regions, institutional settings, and differing economic models suggest the complexity of the regulatory system. Political economy approaches can help to this end. This has implications for studies that are comparing regulatory systems in their risk analysis and in their analysis for decision making. In addition, it is suggested that future research should also consider both the micro and macro-comparative levels, and these should address stakeholders and assess the changes in these deriving from the changes in other systems. It is also suggested that more research is conducted on the complexities within systems as well, for example, the different typologies of public organisations in terms of their management style, knowledge management and decision analysis. Local adaptations and how these are decided can also help address the importance of knowledge management and its role in the risk assessment process.

However, it is important to acknowledge that although specialist views are identified as narrower and limiting to the understanding of events, a wider, multi-level approach also has some limitations. As a broader approach, it can be challenged by its answers to problems as a superficial analysis (Saunders & Wheeler, 1991). The latter, however, can be balanced with the use and inclusion of statistical analysis, cause and effect relations, as well as quantifiable risks and clearer risk management interventions. However, events are not isolated and thus statistical regressions may be limited to combining a number of factors or some factors may lose explanatory value when quantified. Similarly, organisations in the aviation industry are more open rather than closed systems (Harris & Li, 2011). For example, incidents can be the result of airport safety procedures or air traffic control changes and illustrate the

Risk Assessment

complexity of the system and the variety of contributing risk factors which are extra-organisational. Therefore, remedial efforts such as training and procedures, will not have a significant impact (e.g. Li et al., 2007), unless contextualised and addressed. Context-specific research can be addressed by using qualitative methodologies, which add depth and address the context of outcomes (see Ferroff et al., 2012). In addition, because generalisability of results is not possible through the proposed approach, it is suggested that transferability of results is sought by the researchers, focusing on, for example, high-risk industries (e.g. health care, financial institutions). Hence, qualitative, in depth data can be used in combination with other sources of data, such as statistics and quantitative risk management models, yet by pointing insightful directions and not through competing paradigms.

CONCLUSION

The chapter advocated that the complexity of real life needs flexible approaches to research (Checkland & Poulter, 2010) and set out the philosophical differences in thinking about knowledge in the risk management process. The chapter argued that aviation is a complex system and that the knowledge of a complex system can be challenging using traditional risk methodologies, in a big data era. To this illustration, the chapter analyzed the knowledge management paradigms as these are in parallel with the approaches in aviation risk assessment and risk management. The challenges deriving from the analysis centred on the scope of analysis of the system, which, directed by certain risk perceptions, creates specific knowledge, missing issues. The chapter aimed to make clear the opportunities and insights for knowledge management and for risk assessment through soft and critical system lenses. By doing so, the researcher advocated the opportunities of critical interpretivism for the understanding of complex systems, such as aviation. Knowledge, thus, is socially constructed and is affected by information inputs (Boulding 1956). Policy and practice recommendations were, therefore, made and the chapter concluded with implications for future research in organizational studies, macro-level studies, and interdisciplinary research. Instead of focusing on generalized results, the researcher focused on the possibilities for the transferability of insights, emphasizing the importance of context and the understanding of macro level interactions (i.e. between whole systems).

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REFERENCES

- Accident Prevention. (1993). The failure on take-off sets stage for fatal inflight fire and crash. *Flight Safety Foundation*, 50(9), 1–6.
- Airbus. (2014). *Commercial aviation accidents 1958-2014: a statistical analysis*. Retrieved from <http://asndata.aviation-safety.net/industry-reports/Airbus-Commercial-Aviation-Accidents-1958-2014.pdf>
- Akerkar, R. (2014). Analytics on Big Aviation Data: Turning Data into Insights. *IJCSA*, 11(3), 116–127.
- Allianz. (2014). *Global aviation safety study: a review of 60 years of improvement in aviation safety*. Retrieved from <https://www.agcs.allianz.com/assets/PDFs/Reports/AGCS-Global-Aviation-Safety-Study-2014.pdf>
- Angius, S., Frati, C., Gerken, A., Härle, P., Piccitto, M., & Stegemann, U. (2011). Risk modeling in a new paradigm: Developing new insight and foresight on structural risk. *International Journal of Financial Research*, 2(1), 178–196.
- ARMS. (2010). *The ARMS methodology for operational risk assessment in aviation organisations*. Retrieved from <https://www.easa.europa.eu/document-library/general-publications/arms-methodology-operational-risk-assessment-2007-2010>
- Aven, T. (2016). Risk assessment and risk management: Review of recent advances on their foundation. *European Journal of Operational Research*, 253(1), 1–13. doi:10.1016/j.ejor.2015.12.023
- Barach, P., & Small, S. D. (2000). Reporting and preventing medical mishaps: Lessons from non-medical near miss reporting systems. *British Medical Journal*, 320(7237), 759–763. doi:10.1136/bmj.320.7237.759
- Barlas, Y. (1996). Formal aspects of model validity and validation in system dynamics. *System Dynamics Review: The Journal of the System Dynamics Society*, 12(3), 183–210. doi:10.1002/(SICI)1099-1727(199623)12:3<183::AID-SDR103>3.0.CO;2-4
- Barlas, Y., & Carpenter, S. (1990). Philosophical roots of model validation: Two paradigms. *System Dynamics Review*, 6(2), 148–166. doi:10.1002/dr.4260060203
- Barnett, A. (2010). Cross-national differences in aviation safety records. *Transportation Science*, 44(3), 322–332. doi:10.1287/trsc.1090.0313
- Beaubien, J. M., & Baker, D. P. (2002). A review of selected aviation human factors taxonomies, accident/incident reporting systems, and data collection tools. *International Journal of Applied Aviation Studies*, 2(2), 11–36.

Risk Assessment

- Bennett, S. A. (2004). The 1st July 2002 mid-air collision over Uberlingen, Germany: A holistic analysis. *Risk Management: An International Journal*, 6(1), 31–49. doi:10.1057/palgrave.rm.8240171
- Boeing. (2007). *AERO: a quarterly publication*. Retrieved from http://www.boeing.com/commercial/aeromagazine/articles/qtr_2_07/AERO_Q207.pdf
- Boulding, K. E. (1956). General Systems Theory: The skeleton of science. *Management Science*, 2(3), 197–208. doi:10.1287/mnsc.2.3.197
- Bushe, G. R. (1995). Advances in appreciative inquiry as an organization development intervention. *Organization Development Journal*, 13, 14–14.
- Bushe, G. R. (1999). Advances in appreciative inquiry as an organization development intervention. *Organization Development Journal*, 17(2), 61–68.
- Bushe, G. R. (2007). Appreciative inquiry is not about the positive. *OD Practitioner*, 39(4), 33–38.
- Bushe, G. R. (2011). Appreciative inquiry: theory and critique. In D. Boje, B. Burnes, & J. Hassard (Eds.), *The Routledge Companion To Organizational Change* (pp. 87-103). Routledge.
- CAA. (2002). *CAP 719: Fundamental Human Factor Concepts*. Retrieved from <https://publicapps.caa.co.uk/docs/33/CAP719.PDF>
- CAA. (2011). *Human Factors review, Phase two report: Safety Regulation Group*. Retrieved from <http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=4765>
- CAA. (2013). *Global risk picture, a briefing from the Civil Aviation Authority*. Retrieved from [https://publicapps.caa.co.uk/docs/33/CAP%201076%20In%20Focus%20Global%20risk%20\(p\)](https://publicapps.caa.co.uk/docs/33/CAP%201076%20In%20Focus%20Global%20risk%20(p))
- CAA. (2014). EASA FTL combined document. Commission Regulation (EU) No.83/2014, UK.
- Cantore, S. P., & Cooperrider, D. L. (2013). Positive psychology and appreciative inquiry: The contribution of the literature to an understanding of the nature and process of change in organizations. *The Wiley-Blackwell handbook of the psychology of leadership, change, and organizational development*, 267-287.
- Checkland, P. (1985). Achieving desirable and feasible change: An application of soft systems methodology. *The Journal of the Operational Research Society*, 36(9), 821–831.

- Checkland, P. (2000). Soft systems methodology: A thirty-year retrospective. *Systems Research and Behavioral Science*, 17(S1), S11–S58. doi:10.1002/1099-1743(200011)17:1+<::AID-SRES374>3.0.CO;2-O
- Checkland, P., & Poulter, J. (2010). Soft Systems Methodology. In M. Reynolds & S. Holwell (Eds.), *Systems Approaches to Managing Change: A practical guide* (pp. 191–242). The Open University. doi:10.1007/978-1-84882-809-4_5
- Cheek, J., & Rudge, T. (1993). The power of normalisation: Foucauldian perspectives on contemporary Australian health care practices. *The Australian Journal of Social Issues*, 28(4), 271–284. doi:10.1002/j.1839-4655.1993.tb00928.x
- Clinton, V., Oster, J. Jr, & Zorn, C. K. (2013). Analysing aviation safety: Problems, challenges, opportunities. *Research in Transportation Economics*, 43(1), 148–164. doi:10.1016/j.retrec.2012.12.001
- Coghlan, A. T., Preskill, H., & Tzavaras Catsambas, T. (2003). An overview of appreciative inquiry in evaluation. *New Directions for Evaluation*, 2003(100), 5–22. doi:10.1002/ev.96
- Cong, X., & Pandya, K. V. (2003). Issues of knowledge management in the public sector. *Electronic Journal of Knowledge Management*, 1(2), 25–33.
- Cooper, T. (2003). Critical management, critical systems theory and system dynamics. *Systemic Practice and Action Research*, 5(3), 237–249.
- Cooperrider, D. L., & Whitney, D. (2001). A positive revolution in change: Appreciative inquiry. *Public Administration and Public Policy*, 87, 611-630.
- Cooperrider, D. L., Whitney, D. K., & Stavros, J. M. (2003). *Appreciative inquiry handbook* (Vol. 1). Berrett-Koehler Publishers.
- Daellenbach, H. G. (2001). Hard OR, soft OR, problem structuring methods, critical systems thinking: a primer. In *Proceedings of the ORSNZ Conference Twenty Naught One*. University of Canterbury.
- Debrincat, J., Bil, C., & Clark, G. (2010, September). Assessing organisational factors in aircraft accidents: methodologies and limitations. *Proc. 27th Congress of the International Council of the Aeronautical Sciences*.
- Dekker, S. W. A. (2002). *The field guide to human error investigations*. Ashgate.
- Dubois, D., & Guyonnet, D. (2011). Risk-informed decision-making in the presence of epistemic uncertainty. *International Journal of General Systems*, 40(2), 145–167. doi:10.1080/03081079.2010.506179

Risk Assessment

- EASA. (2009). *Guidance on Hazard Identification: Safety Management System and Safety Culture Working Group*. Retrieved from <https://www.easa.europa.eu/document-library/general-publications/ecast-guidance-hazards-identification>
- EASA. (2015). *Annual Safety Review 2014*. Retrieved from <http://asndata.aviation-safety.net/industry-reports/EASA-Annual-safety-review-2014.pdf>
- EASA. (2015a). *Action plan for the implementation of the Germanwings Task Force recommendations*. Retrieved from https://www.easa.europa.eu/download/various/GW_actionplan_final.pdf
- EASA. (2016). *Annual Safety Review 2016*. Retrieved from https://www.easa.europa.eu/system/files/dfu/209735_EASA_ASR_MAIN_REPORT.pdf
- ECA. (2013). *Flight plan to safety*. Retrieved from https://www.eurocockpit.be/sites/default/files/eca_flight_plan_to_safety_13_1204_f-web.pdf
- Economist. (2019). *Regulatory capture may be responsible for Boeing's recent problems*. Retrieved from <https://www.economist.com/business/2019/03/23/regulatory-capture-may-be-responsible-for-boeings-recent-problems>
- FAA. (2011, May). *Threat and error management and hazard identification on airports*. Paper presented at the Airports Conference, Washington, DC.
- Fan, J., Han, F., & Liu, H. (2014). Challenges of big data analysis. *National Science Review*, 1(2), 293–314. doi:10.1093/nsr/nwt032
- Foucault, M. (2008). Panopticism “from” Discipline & Punish: The Birth of the Prison. *Race/Ethnicity. Multidisciplinary Global Contexts*, 2(1), 1–12.
- Gander, P., Hartley, L., Powell, D., Cabon, P., Hitchcock, E., Mills, A., & Popkin, S. (2011). Fatigue risk management: Organisational factors at the regulatory and industry/company level. *Accident; Analysis and Prevention*, 43(2), 573–590. doi:10.1016/j.aap.2009.11.007
- Gardenfors, P., & Sahlin, N.-E. (1982). Unreliable probabilities, risk taking, and decision-making. *Synthese*, 53(1), 361–386. doi:10.1007/BF00486156
- Green, W. G. (2008). *Hazards, Threats, Risk, Etc*. University of Pittsburgh.
- Grote, G. (2012). Safety management in different high-risk domains – All the same? *Safety Science*, 50(10), 1983–1922. doi:10.1016/j.ssci.2011.07.017
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105–117). Sage Publications.

- Guldenmund, F., Hale, H., Goossens, L., Betten, J., & Duijm, N. J. (2006). The development of an audit technique to assess the quality of safety barrier management. *Journal of Hazardous Materials*, *130*(3), 234–241. doi:10.1016/j.jhazmat.2005.07.011
- Hadjimichael, M. (2009). A fuzzy expert system for aviation risk assessment. *Expert Systems with Applications*, *36*(1), 6512–6519. doi:10.1016/j.eswa.2008.07.081
- Haltiwanger, G., Landaeta, R. E., Pinto, C. A., & Tolk, A. (2010). Understanding the relationship between Risk Management and Knowledge Management: A literature review and extension. *International Journal of Knowledge Management Studies*, *4*(3), 281–300. doi:10.1504/IJKMS.2010.038170
- Hardy, C., & Maguire, S. (2016). Organising risk: Discourse, power and “riskification”. *Academy of Management Review*, *41*(1), 80–108. doi:10.5465/amr.2013.0106
- Harris, D., & Li, W. C. (2011). An extension of the human factors analysis and classification system for use in open systems. *Theoretical Issues in Ergonomics Science*, *12*(2), 108–128. doi:10.1080/14639220903536559
- Hatvani, E. N. C. (2015). Risk analysis and risk management in the public sector and in public auditing. *Public Finance Quarterly*, *1*(7), 7–28.
- Herrera, I. A., Nordskog, A. O., Myhre, G., & Halvorsen, K. (2009). Aviation safety and maintenance under major organisational changes, investigating non-existing accidents. *Accident; Analysis and Prevention*, *41*(6), 1155–1163. doi:10.1016/j.aap.2008.06.007
- Hilgartner, S. (1992). The Social construction of risk objects: or, how to pry open networks of risk. In J. F. Short & L. Clarke (Eds.), *Organizations, Uncertainties, and Risk*. Boulder, CO: Westview Press.
- Hollnagel, E. (2006). The myth of human error in risk analysis and safety management. Industrial Safety Chair, École nationale supérieure des Mines de Paris Pôle Cindyniques, Sophia Antipolis, France.
- Hsu, Y. L., Li, W. C., & Chen, K. W. (2010). Structuring critical success factors of airline safety management system using a hybrid model. *Transportation Research Part E, Logistics and Transportation Review*, *46*(2), 222–235. doi:10.1016/j.tre.2009.08.005
- IATA. (2015). *Safety Report*. Retrieved from <https://www.iata.org/publications/Documents/iata-safety-report-2015.pdf>
- IATA. (2019). *Safety Report 2018*. Retrieved from <https://www.iata.org/publications/Pages/safety-report.aspx>

Risk Assessment

Ibrahim, F. (2017). Knowledge management methodology: Developing a phenomenological Middle- range thinking approach for knowledge management research. *Journal of Management Research*, 9(4), 110–122. doi:10.5296/jmr.v9i4.10790

ICAO. (2010). *Road to recovery*. Retrieved from https://www.icao.int/publications/DownloadButton/6502_en.pdf

ICAO. (2013). *Safety Management Manual (SMM)* (3rd ed.). Montréal, Canada: International Civil Aviation Organization.

Interstate Aviation Committee. (2016). *Interim report: preliminary reference information on accident investigation, Boeing 737-800, A6-FDN*. Retrieved from [http://asndata.aviation-safety.net/reports/2016/20160319-0_B738_A6-FDN_\(Interim\).pdf](http://asndata.aviation-safety.net/reports/2016/20160319-0_B738_A6-FDN_(Interim).pdf)

Janic, M. (2000). An assessment of risk and safety in civil aviation. *Journal of Air Transport Management*, 6(1), 43–50. doi:10.1016/S0969-6997(99)00021-6

Jonas, W. (2014). The strengths/limits of Systems Thinking denote the strengths/limits of Practice-Based Design Research. *FORMakademisk–Research Journal for Design and Design Education*, 7(4), 1-11.

Klinke, A., & Renn, O. (2002). A new approach to risk evaluation and management: Risk-based, precaution-based, and discourse-based strategies. *Risk Analysis*, 22(6), 1071–1094. doi:10.1111/1539-6924.00274

Knibbs, K., Underwood, J., MacDonald, M., Schoenfeld, B., Lavoie-Tremblay, M., Crea-Arsenio, M., ... Ehrlich, A. (2010). Appreciative inquiry: A strength-based research approach to building Canadian public health nursing capacity. *Journal of Research in Nursing*, 17(5), 484–494. doi:10.1177/1744987110387472

Leischow, S. J., Best, A., Trochim, W. M., Clark, P. I., Gallagher, R. S., Marcus, S. E., & Matthews, E. (2008). Systems thinking to improve the public's health. *American Journal of Preventive Medicine*, 35(2), 196–203. doi:10.1016/j.amepre.2008.05.014

Leveson, N. (2003). A new accident model for engineering safety systems. *Safety Science*, 42(4), 237–270. doi:10.1016/S0925-7535(03)00047-X

Li, M. Z., & Ryerson, M. S. (2019). Reviewing the DATAS of aviation research data: Diversity, availability, tractability, applicability, and sources. *Journal of Air Transport Management*, 75(1), 111–130. doi:10.1016/j.jairtraman.2018.12.004

Li, W.-C., Harris, D., & Yu, C.-S. (2007). Routes to failure: Analysis of 41 civil aviation accidents from the Republic of China using the human factors analysis and classification system. *Accident; Analysis and Prevention*, 40(2), 426–434. doi:10.1016/j.aap.2007.07.011

Loukopoulos, L. D., & Dismukes, R. K. (2002). *Human error in aviation operations: ideas for the transfusion medicine area*. Human Factors Division, NASA Ames Research Center.

Luxhøj, J. T., & Maurino, M. (2001). An aviation system risk model (ASRM) case study: Air Ontario 1363. *The Rutgers Scholar*, 1.

Marais, K., Dulac, N., & Leveson, N. (2004, March). Beyond normal accidents and high reliability organizations: The need for an alternative approach to safety in complex systems. In *Engineering Systems Division Symposium* (pp. 1-16). MIT.

McAdam, R., & Reid, R. (2000). A comparison of public and private sector perceptions and use of knowledge management. *Journal of European Industrial Training*, 24(6), 317–329. doi:10.1108/03090590010346424

Meadows, D. H. (1980). The Unavoidable A Priori. In J. Randers (Ed.), *Elements of the System Dynamics Method* (pp. 23–56). Springer.

Michael, S. (2005). The promise of appreciative inquiry as an interview tool for field research. *Development in Practice*, 15(2), 222–230. doi:10.1080/09614520500042094

Mingers, J. (1997). *Multimethodology*. Wiley Encyclopedia of Operations Research and Management Science.

Mingers, J., & Brocklesby, J. (1997). Multimethodology: Towards a framework of mixing methodologies. *International Journal of Management Sciences*, 25(5), 489–509. doi:10.1016/S0305-0483(97)00018-2

Niles, M. C. (2002). On the Hijacking of Agencies (and Airplanes): The Federal Aviation Administration, Agency Capture, and Airline Security. *Am. UJ Gender Soc. Pol’y & L.*, 10, 381.

NTSB. (2010). *Loss of Control on Approach, Colgan Air, Inc., Operating as Continental Connection Flight 3407, Bombardier DHC-8-400, N200WQ, Clarence Center, New York, February 12, 2009*. Retrieved from <https://www.nts.gov/investigations/AccidentReports/Reports/AAR1001.pdf>

NTSB. (2014). *Board Meeting Title: Crash of Asiana Flight 214 Accident Report Summary*. Retrieved from https://www.nts.gov/news/events/Pages/2014_Asiana_BMG-Abstract.aspx

Risk Assessment

Oster, C. V., Strong, J. S., & Zorn, C. K. (1992). *Why airplanes crash: Aviation safety in a changing world*. Oxford University Press on Demand.

Oster, C. V. Jr, Strong, J. S., & Zorn, C. K. (2013). Analysing aviation safety: Problems, challenges, opportunities. *Research in Transportation Economics*, 43(1), 148–164. doi:10.1016/j.retrec.2012.12.001

Papanikou, M., & Veersma, U. (2012). Power relations and safety in commercial aviation: professional identity and occupational clashes. In S. J. Landry (Ed.), *Advances in Human Aspects of Aviation* (pp. 528–537). Taylor and Francis.

Patton, M. Q. (1975). *Alternative evaluation research paradigms*. North Dakota Study Group on Evaluation, University of North Dakota.

Pidd, M. (2004). *Systems modelling: theory and practice*. Wiley.

Power, M., Scheytt, T., Soin, K., & Sahlin, S. (2009). Reputational risk as a logic for organising in late modernity. *Organization Studies*, 30(2/3), 301–324. doi:10.1177/0170840608101482

Rasmussen, J., & Batstone, R. (1989). Why do complex organizational systems fail? World Bank Policy Planning and Research Staff, Environment Department.

Reason, J. (1990). The contribution of latent human failures to the breakdown of complex systems. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 327(1241), 475–484.

Reason, J. (1993). The identification of latent organisational failures in complex systems. In J.A. Wise, V.D. Hopkin, & P. Stager (Eds.), *Verification and validation of complex systems: Human Factors Issues* (pp. 223-237). Springer-Verlag.

Reason, J. (2004). *Managing the risks of organisational accidents*. Cleveland, OH: RMVC.

Reason, J., Parker, D., & Lawton, R. (1998). Organisational controls and safety: The varieties of rule-related behavior. *Journal of Occupational and Organizational Psychology*, 71(4), 289–304. doi:10.1111/j.2044-8325.1998.tb00678.x

Reed, J., Pearson, P., Douglas, B., & Wilding, H. (2002). Going home from hospital: an appreciative inquiry study. In S. Barrett, C. Komaromy, M. Robb, & A. Rogers (Eds.), *Communication relationships and care: a reader* (pp. 338–346). Routledge.

Remawi, H., Bates, P., & Dix, I. (2011). The relationship between the implementation of a Safety Management System and the attitudes of employees towards unsafe acts in aviation. *Safety Science*, 49(5), 625–632. doi:10.1016/j.ssci.2010.09.014

- Reynolds, M., & Holwell, S. (2010). Introducing systems approaches. In M. Reynolds & S. Holwell (Eds.), *Systems Approaches to Managing Change: A Practical Guide* (pp. 1–23). Springer. doi:10.1007/978-1-84882-809-4_1
- Riege, A., & Lindsay, N. (2006). Knowledge management in the public sector: Stakeholder partnerships in the public policy development. *Journal of Knowledge Management, 10*(3), 24–39. doi:10.1108/13673270610670830
- Rothblum, A. M., Wheal, D., Withington, S., Shappell, S. A., Wiegmann, D. A., Boehm, W., & Chaderjian, M. (2002). Human factors in incident investigation and analysis. *2nd International Workshop on Human Factors in Offshore Operations*.
- Sağsan, M., Medeni, İ. T., & Medeni, T. D. (2016). Knowledge management paradigms: Implementation through individual fuzzy-based education. *Procedia Computer Science, 102*, 259–266. doi:10.1016/j.procs.2016.09.399
- Saha, B., & Srivastava, D. (2014, March). Data quality: The other face of big data. In *2014 IEEE 30th International Conference on Data Engineering* (pp. 1294-1297). IEEE.
- Sahlin, N.-E., & Persson, J. (1994). Epistemic risk: the significance of knowing what one does not know. In B. Brehmer & N.-E. Sahlin (Eds.), *Future risks and risk management* (pp. 37–62). Kluwer Academic Publishers. doi:10.1007/978-94-015-8388-6_2
- Saunders, R., & Wheeler, T. (1991). *Handbook of safety management*. Pitman.
- Seeger, M. W. (2006). Best practices in crisis communication: An expert panel process. *Journal of Applied Communication Research, 34*(3), 232–244. doi:10.1080/00909880600769944
- Simon, K. H. (2009). Critical systems thinking. *Systems Science and Cybernetics, II*, 196–207.
- Skjong, R., & Wentworth, B. H. (2001). Expert judgment and risk perception. In *Eleventh International Offshore and Polar Engineering Conference*. International Society of Offshore and Polar Engineers.
- Soin, K., & Scheytt, T. (2006). Making the case for narrative methods in cross-cultural organizational research. *Organizational Research Methods, 9*(1), 55–77. doi:10.1177/1094428105283297
- Soo, C., Devinney, T., Midgley, D., & Deering, A. (2002). Knowledge management: Philosophy, processes, and pitfalls. *California Management Review, 44*(4), 129–150. doi:10.2307/41166146

Risk Assessment

Speyer, J. (2004). *Example application of aircrew incident reporting system (AIRS)*. Retrieved from https://flightsafety.org/wp-content/uploads/2016/09/AIRS_application.pdf

Stahl, B. C., Lichtenstein, Y., & Mangan, A. (2003). The limits of risk management: A social construction approach. *Communications of the International Information Management Association*, 3(3), 15–22.

Thaw, D. (2014). Enlightened regulatory capture. *Washington Law Review (Seattle, Wash.)*, 89, 329.

Theocharis, S. A., & Tschritzis, G. A. (2016). Knowledge Management systems in the public sector: Critical issues. *Lecture Notes on Software Engineering*, 4(1), 59–65. doi:10.7763/LNSE.2016.V4.224

Törner, M. (2011). The ‘social-physiology’ of safety: An integrative approach to understanding organisational psychological mechanisms behind safety performance. *Safety Science*, 49(8), 1262–1269. doi:10.1016/j.ssci.2011.04.013

Trist, E. (1981). *The evolution of socio-technical systems: a conceptual framework and an action research program*. Occasional Paper, No. 2.

Turner, N., & Tennant, S. J. (2010). As far as is reasonably practicable: Socially constructing risk, safety, and accidents in military operations. *Journal of Business Ethics*, 91(1), 21–33. doi:10.1007/10551-009-0065-5

Ulrich, W. (2003). Beyond methodology choice: Critical systems thinking as critically systemic discourse. *The Journal of the Operational Research Society*, 54(4), 325–342. doi:10.1057/palgrave.jors.2601518

Underwood, P., & Waterson, P. (2013). Systemic accident analysis: Examining the gap between research and practice. *Accident; Analysis and Prevention*, 55, 154–164. doi:10.1016/j.aap.2013.02.041

Whitney, D., & Cooperrider, D. L. (2000). The appreciative inquiry summit: An emerging methodology for whole system positive change. *OD Practitioner*, 32(1), 13–26.

Wiegmann, D. A., & Shappell, S. A. (2001). Human error analysis of commercial aviation accidents: Application of the Human Factors Analysis and Classification System (HFACS). *Aviation, Space, and Environmental Medicine*, 72(11), 1006–1016.

Wincher, D. (2013). *NASA’s Aviation Safety Reporting System (ASRS): the voice of front-line employees*. Humans as the last barriers, European HRO Conference, Aix En Provence.

Wise, J. A., Hopkin, V. D., & Garland, D. J. (2010). *Handbook of aviation human factors* (2nd ed.). CRC Press, Taylor & Francis Group.

ADDITIONAL READING

Dekker, S. (2014). *Safety differently: human factors for a new era*. CRC Press. doi:10.1201/b17126

Ferroff, C. V., Mavin, T. J., Bates, B. R., & Murray, P. S. (2012). A case for social constructionism in aviation safety and human performance research. *Aeronautica*, 2(1), 1–12.

Fraher, A. (2014). *The next crash: how short-term profit seeking trumps airline safety*. USA: ILR Press, Cornell.

Hilgartner, S. (1992). The Social construction of risk objects: or, how to pry open networks of risk. In J. F. Short & L. Clarke (Eds.), *Organizations, Uncertainties, and Risk* (pp. 39–53). Boulder: Westview Press.

Katerinakis, T. (2019). *The social construction of knowledge in mission-critical environments*. Springer. doi:10.1007/978-3-319-91014-7

Lofquist, E. A. (2010). The art of measuring nothing: The paradox of measuring safety in a changing civil aviation industry using traditional safety metrics. *Safety Science*, 48(10), 1520–1529. doi:10.1016/j.ssci.2010.05.006

Luhmann, N., Baecker, D., & Gilgen, P. (2013). *Introduction to systems theory*. Cambridge: Polity.

Power, M. (2004). The risk management of everything. *The Journal of Risk Finance*, 5(3), 58–65. doi:10.1108/eb023001

KEY TERMS AND DEFINITIONS

Accident: An event that has led to loss of life and/or severe economic loss.

Barrier: A system, procedure, or object that protects (acts as a barrier) from an identified risk.

Incident: An event that has led to some economic damage that is worth analyzing and/or reporting and recording.

Paradigm: The lens through which a problem is perceived, and hence approached.

Risk Assessment

Risk: Anything that can have a minor, major or severe effect and has a probability of occurring.

Safety Culture: A culture of trust that supports sharing learning, experiences, and reporting.

SMS: Safety management systems is the collection of policies, procedures, reporting systems, training tools, etc. that aim to manage safety in an organization.

ENDNOTES

- ¹ Boeing's new automated aircraft, the 737-MAX was involved two times within a few months in two fatal crashes.
- ² CFIT is an accident in which there is In-flight collision with terrain, water, or obstacle without indication of loss of control (IATA 2015a).
- ³ The significant seven are: Loss of Control, Runway Excursion, CFIT, Runway Incursion, Airborne Conflict, Ground Handling and Fire (CAA 2013).
- ⁴ The technical paradigm overlaps with the rest of the paradigms when these are discussed with aviation risk management approaches. In addition, indicative theories and models are presented in the chapter to fit the purpose of the analysis.
- ⁵ See, for example, ICAO's 2017 annual safety report.

Chapter 4

Communication Barriers and Social Capital: Improving Information and Knowledge Flows in Public Services

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ABSTRACT

The aim of this chapter is to explore ways in which the flows of information and knowledge within public services are affected by social capital. Drawing on communication and social capital theory and making use of network analysis tools, a regional department of a Greek social security entity served as a case study to assess the contribution of social capital to overcoming barriers to effective communication among public sector employees. Structural, relational, and cognitive social capital at a personal level were found to alleviate problems of accessibility as well as problems related to the control of the flow of information by gatekeepers, arbitrarily abridging, or distorting messages. Building new communication channels through personal initiative, establishing and maintaining good relationships among employees, and developing shared perceptions about communication and information sharing are facets of social capital that seem to ensure a more effective knowledge and information flow.

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INTRODUCTION

Public sector competencies pertaining to service provision for citizens and businesses involve the transfer of information and knowledge across an often complex network of managers, senior staff and employees in the public sector. An important part of this information, however readily available through a wide range of e-government applications, is still sought through face-to-face interaction with public services front-line employees (Pieterse & Ebbers, 2008). In Greece, in particular, the percentage of citizens who made use of the internet in their dealings with public services was close to 12% in 2010, one of the lowest in OECD countries (Organization for Economic Co-operation and Development [OECD], 2011). Respectively, business management literature has showcased a tendency shared by employees to seek information and useful knowledge from coworkers and associates rather than from impersonal sources such as documents or electronic databases (Abrams, Cross, Lesser, & Levin, 2003; Levin & Cross, 2004), highlighting the importance of people and social structures in knowledge management endeavors (Colnar & Dimovski, 2017). As a result, attention is called to the significance of the role of public sector employees as nodes of a network in which information and knowledge flows before it finally reaches citizens. A network is by definition characterized by the existence or lack of connections among nodes; social capital theory, examining resources and benefits stemming from one's participation in social networks (Burt, 1997, 2000; Coleman, 1988; Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998), is therefore a useful tool in studying the effectiveness of flows in the information transfer network.

As the processing and transfer of information and knowledge is part of the communication process, effective communication is key to the effectiveness of services provided. Factors facilitating or hindering the communication process respectively enhance or limit the effectiveness of knowledge and information flows. The role of communication in the creation of social capital has been thoroughly studied (e.g. Coleman, 1988; Pang, Shin, Lew, & Walther, 2018; Thomas & Paul, 2019; Tsai & Ghoshal, 1998); the reciprocity of this relationship, however, namely the potential influence of social capital on communication frequency and quality, is yet to be explored. Furthermore, social capital research has been centered on private firms (e.g. Allameh, 2018; Carey, Lawson, & Krause, 2011; Cousins, Handfield, Lawson, & Petersen, 2006; Inkpen & Tsang 2005; Villena, Revilla, & Choi, 2011) while public organizations studies have mostly focused on the effect of trust (Pee & Kankanhalli, 2016).

In this chapter two significant communication barriers will be considered: accessibility problems, i.e. lack of connection –or in other words communication-between nodes in the network, impeding the flow of information; and problems

related to the control of knowledge and information flows in various parts of the network by gatekeepers, arbitrarily abridging or distorting messages.

The role of three facets of social capital as described by Nahapiet and Goshal (1998) in alleviating these communication barriers is then examined. Structural capital, considered as resources derived from the existence of a dense network (Tsai & Goshal, 1998), may help accelerate the dissemination of information while creating a wider choice of alternative paths to useful knowledge. Relational capital, namely the establishment of close relationships of trust and respect (Kale, Singh, & Perlmutter, 2000) and the existence of mutual obligations and expectations (Coleman, 1988), affects not only the frequency but also the quality of communication in the network. Cognitive social capital, referring to shared perceptions and systems of meaning between members of a network (Nahapiet & Goshal, 1998), is considered as shared norms and perceptions about communication and information sharing that can significantly affect information and knowledge seeking patterns.

Drawing on communication and social capital theory and making use of network analysis tools, a regional department of a Greek social security entity was used as a case study to assess the contribution of social capital overcoming barriers to effective communication among public sector employees. Radical changes were recently introduced in the Greek social security system and a multitude of fragmented social security entities were incorporated in a single social security organization, set forth in Greek legislation in 2016. As a new organization chart has just been released by Presidential Decree in January, 2019, and is not yet in effect, employees are called upon to handle overwhelming quantities of new information and are yet to be assimilated in a new, wider network.

BACKGROUND

Communication and the Network Paradigm

Communication consists of two basic processes: conveyance of information and convergence of meaning, both of which involve the transmission and processing of information (Dennis, Fuller, & Valacich, 2008). Information is usually differentiated from knowledge, which entails appropriation and assimilation of information received; the lines between the two, however, are often blurred (Zins, 2007). In order to successfully carry out organizational tasks, coordinate activities and assess the environment an exchange of information is required; that said, information acquires meaning and value as it is processed and transmitted across official and informal organizational networks (Daft, Lengel, & Trevino, 1987).

Communication as a simple linear process of transmitting a message from a person or group (sender) to one or more receivers tends to be considered an outdated concept, as researchers have long focused on the creation of meaning through interaction and two-way participation of everybody involved, at every step of the way (Hallahan, Holtzhausen, Van Ruler, Verčič, & Sriramesh, 2007; Varey, 2000). However, the linear (mathematical) model of communication (Shannon, 1948) is still useful for studying issues of accessibility in an information network (Nahapiet & Goshal, 1998) and, by extension, issues related to the flow of information across a network of employees. Moreover, Shannon's model introduces the concept of communication "noise": of unwelcome elements interfering in the process of communication resulting to loss of message integrity (Sethi & Seth, 2009; Mittal, 2018).

The social network paradigm has been increasingly employed in business management research, as part of a shift toward less individualist and more relational and integral approaches (Borgatti & Foster, 2003). In the public sector, a wide and often complex network of organizations and people transfers information from its source (legislative, executive and judicial bodies, senior management of state organizations) to its end recipient (citizens, businesses) through various intermediate stages of processing. In this respect, the study focuses on relationships (or lack thereof) between people or collective units that are part of the network, so that social capital theory is a particularly useful tool.

Knowledge Flows and the Three Aspects of Social Capital

Social capital refers to value created and benefits gained by investing in social relations (Lin, 2008, 2017). Nahapiet and Goshal (1998) have described three distinct facets of social capital: structural social capital, which refers to the structure of a social network and type of ties formed between nodes; relational social capital, referring to the development of relationships of trust and mutual obligations over time among members of a network; and cognitive social capital, which involves shared perceptions, narratives, codes and language among members of a network. Social capital theory has been applied to the study of knowledge networks (García-Villaverde, Parra-Requena, & Molina-Morales, 2018; Inkpen & Tsang, 2005, 2016; Nahapiet & Goshal, 1998; Reagans & McEvily, 2003), examining mechanisms and procedures related to the communication process and the conveyance of information. Social relationships and interactions among employees are important communication channels through which knowledge flows (Pee & Kankanhalli, 2016).

Network structure is closely connected to the control and efficiency of information flows (Inkpen & Tsang, 2016). In dense networks, benefits accrue through the existence of ties between as many nodes as possible; while the existence of structural holes in the network is the source of benefits for nodes able to take advantage of brokerage

opportunities, creating an intermediate link between nodes that are not otherwise connected (Burt, 2000). Structural characteristics of a network such as density and hierarchy or centralization are related to flexibility and ease of information exchange, as they affect access to members of the network (Inkpen & Tsang, 2005; Nahapiet & Goshal, 1998). Moreover, network density has been linked to the frequency of communication between nodes (Coleman, 1988). Spanning structural holes offers access to more, non-redundant and timely information (Burt, 1997). However, the importance of value created by the existence of strong ties between all members of a dense network is also underlined (e.g. Coleman, 1988). This viewpoint takes into account the interaction of structure and content (quality) of the relations between nodes, which is largely ignored in Burt's structural holes theory (Podolny & Baron, 1997). Selecting the most advantageous structure depends on the objectives most important to each network, so that an efficient network structure that allows quick access to new and diverse information may not favor the development of relational and cognitive social capital required for knowledge transfer (Nahapiet & Goshal, 1998). A dense structure (more connections between nodes) promotes the diffusion of information and knowledge while allowing for more flexibility, as information flows can reach each node through several alternative paths.

Relational social capital bears upon aspects such as mutual trust, respect and close friendly relationships (Kale et al., 2000). Trust, as a central facet of relational capital, is crucial to knowledge production and sharing in an organizational network (Abrams et al., 2003; Levin & Cross, 2004; Nahapiet & Goshal, 1998; Tsai & Goshal, 1998). Trust refers to the integrity, perceived benevolence and faith in the abilities and skills of the person trusted (Mayer, Davis, & Schoorman, 1995). Trust and strong social ties can enhance the quality and effectiveness of the knowledge transferred (Thomas & Paul, 2019).

The cognitive aspect of social capital refers to the development of a shared frame of reference which can be expressed as shared codes, language and narratives (Nahapiet & Goshal, 1998), a shared vision (Tsai & Goshal, 1998), shared goals and culture (Inkpen & Tsang, 2005; Tantardini & Kroll, 2015), shared aspirations and values (Carey et al., 2011). Shared codes and a common language of communication facilitate access to information and assimilation of new knowledge (Collins & Smith, 2006). The development of shared understandings is key to effective knowledge sharing (Dawes, Cresswell, & Pardo, 2009). Choi's study (2016) has also shown that both the relational and cognitive aspects of social capital significantly affect employee knowledge-sharing behaviour in the US public sector. Exploring network members' perceptions about norms and expectations regarding information sharing and communication in the organization is most useful in studying barriers to communication.

Accessibility and Gatekeeping in Knowledge Networks

In communication theory, any factor undermining the effective transmission of information or altering its content, whether a physical/technical or other barrier such as the use of complex professional jargon, filtering, cultural differences, and so on (Sethi & Seth 2009) is referred to as *noise* (Shannon, 1948). Accessibility among members of a network is indispensable in being able to leverage the expertise of those in other parts of the network (Borgatti & Cross, 2003). Accessibility problems ultimately pertain to the absence of ties, namely of communication, between nodes in the network, resulting in interrupting the flow of information. Mutual access among members of a network is indispensable in order to be able to make use of information in possession of any single person or group (Borgatti & Cross, 2003). Effectiveness in locating useful knowledge is dependent on the presence of direct or even indirect connections (or ties) to pertinent nodes in the network. Direct ties translate to immediate access to the required information and are often indispensable to its assimilation; indirect connections are also useful in letting know where knowledge can be found –provided that all nodes in the network are ultimately accessible (Hansen, 2002).

In any chain of communication, every person but the first and the last is a gatekeeper who can choose to fully pass on the message or not at all, omit elements or add to it (Schramm, 1963). Structural holes in a network provide control benefits to those in a position to bridge them (Burt, 1997). Thus the flow of information is often encumbered by individuals whose position in the network gives them control to act as gatekeepers. Central nodes that lie along a great number of paths which new information needs to travel in order to reach other nodes are in a position to control information flows but also risk becoming bottlenecks slowing down knowledge flows due to information overload (Borgatti & Li, 2009). Togola et al. (2019) have shown in their study of knowledge transfer in globally distributed teams that knowledge flows heavily rely on key employees who cannot afford the time to contribute to knowledge transfer activities due to work overload.

The role of gatekeeper is not necessarily a negative one, since a gatekeeper acts as a bridge transcending departmental or organizational boundaries and in this way can provide a link between different parts of the network and improves communication effectiveness (Barzilai-Nahon, 2009). In a network with a large number of members, maintaining all possible ties between nodes exceeds the communication capabilities of any single person (Monge & Contractor, 2001) and entails an increased cost in time and effort. Thus controlling the flow of communication may contribute to managing an overwhelming volume of information. However, in business management literature emphasis is usually placed on the gatekeeper's editorial role, alluding to communication theory; from this point of view, a gatekeeper is a person who is in

a position to control and filter the flow of information, deciding which information is important enough to be relayed to other points in the networks and which is not (Barzilai-Nahon, 2009; Haas, 2015).

The Role of Social Capital

When a node in the network is not accessible, the flow of information is interrupted so that information is not available where needed in a timely manner. Accessibility, however, is most times not a characteristic of an individual but of his or her *relationship* with the one trying to gain access, so that accessibility often seems to be selective (Borgatti & Cross, 2003). Consequently, social capital is extremely valuable in dealing with accessibility problems. Structural social capital, seen as a dense network, whose members benefit from frequent and close social interaction (Tsai & Goshal, 1998), leads to increased access to more nodes in the network.

At the same time, the quality of relationships that relational social capital brings about also positively affects accessibility. Emotional commitment in a relationship can motivate both parties to provide support and assistance to each other so that they are willing to bear the cost of time and effort to share their knowledge (Reagans & McEvily, 2003). Furthermore, a close relationship at a dyadic level provides access to all of each other's contacts in the network (Choi & Kim, 2008). In this respect, strong ties between nodes, marked by frequent communication and emotional closeness, lead to increased availability (Granovetter, 1983) and help acquire useful knowledge more than weak ties (Levin & Cross, 2004). Moreover, relationships of trust, respect, mutual obligations and expectations among members of a network, often create a communication structure connecting individuals and groups regardless of their official position and formal role in the network (Monge & Contractor, 2003).

Norms of cooperation in an organization can also affect accessibility. Social norms of open communication and teamwork, for instance, ensure access to individuals in possession of useful knowledge and provide motivation for employees to engage in knowledge sharing activities (Nahapiet & Goshal, 1998). Mattessich and Monsey (1992) discuss aspects of open communication such as close interaction, mutual sharing of new information, open discussion of any issues that arise, and diffusion of all necessary information among members of a group. Such a shared frame of reference constitutes a facet of cognitive social capital that contributes to establishing and maintaining channels of communication among members of an organization's internal network.

In a network where the flow of information is controlled by centrally positioned nodes acting as intermediaries for other members of the network (Freeman, 1978) information can potentially be withheld or even distorted. As information can be omitted and inadvertently or intentionally withheld at every point in the network,

Communication Barriers and Social Capital

shorter communication paths with fewer intermediaries help reduce the risk of loss of information integrity in a knowledge network (Hansen, 2002).

Factors pertaining to the cognitive aspect of social capital have also been connected to the need for a gatekeeper to relay information to peripheral points in the network. Tushman and Katz (1980) have shown that when all members of an organizational network share the same norms, values, and communication codes, effective communication is possible between any two members of the network so that a gatekeeper is not only redundant but detrimental to productivity.

In the light of the above, three research propositions were developed:

- P1: Structural social capital, as a dense network of relations, contributes to the alleviation of problems of accessibility and editorial gatekeeping in an organizational network
- P2: Relational social capital, as the development of personal relationships of trust, respect and mutual expectations, contributes to the alleviation of problems of accessibility and editorial gatekeeping in an organizational network
- P3: Cognitive social capital, as shared perceptions and expectations regarding norms of communication and information sharing, contributes to the alleviation of problems of accessibility and editorial gatekeeping in an organizational network

METHODOLOGY

As extant literature does not offer sufficient research or empirical data to support the research propositions, a case study method was chosen to further explore the relationships proposed. Furthermore, the complexity of variables that need to be taken into consideration would jeopardize the effectiveness of a quantitative method (Stuart, McCutcheon, Handfield, McLachlin, & Samson, 2002). A case study approach is also pertinent due to the difficulty in discerning boundaries between phenomena and context (Yin, 1981). Acts of communication continually and dynamically shape the context in which communication takes place, as goals, norms and shifting relationships between members of a team lead to different roles and behaviors within a group (Schramm, 1971). A regional department of a Greek social security entity was selected as a typical example of a small intra-organizational network with heavy flows of information and new knowledge.

The use of network analysis tools was required, as all concepts and processes examined are centered on the relationships developed between persons or groups rather than on the characteristics of independent, isolated individuals (Wasserman & Faust, 1994) so that individual-oriented methods of collecting and processing data were not suitable. Furthermore, drawing on different available sources (triangulation)

and combining qualitative and quantitative data contributes to the substantiation of the research propositions (Eisenhardt, 1989). To this end, official data and records of the social security entity examined (organization charts, legal framework and other documents describing competences and responsibilities, official correspondence records) were taken into account in illustrating the official information transfer network; they were also useful in providing a number of elements affecting this study, such as hierarchy, employees' location, tasks and responsibilities, production of new information e.t.c.

Data was primarily collected with the use of a questionnaire, a research tool often used in case studies to strengthen the validity of the findings (Voss, Tsiriktsis, & Frohlich, 2002). The questions also served as prompts for in-depth personal interviews with all respondents at a later stage of the research. As the study is focused on the internal knowledge network, employees were first asked to indicate the person/persons to whom they usually turn to in search of information needed to fulfill their tasks and, conversely, persons turning to them to seek information, thus verifying the existence of links among members of the network (Hansen, 2002). Their relationship with the person/persons indicated as sources of information relevant to their work was then gauged by filling in up to five questionnaires each, concentrating on the persons they most often turn to for information (Allen, James, & Gamlen, 2007). Since a network analysis approach was followed, it was ensured that all employees of the selected department, without exception, participated in the survey (Hanneman & Riddle, 2005); 56 questionnaires were completed by 23 participants, reflecting 54 relationships in total.

Since attention is centered on relationships between members of the network and not on each one's individual characteristics, social network analysis was used to process the questionnaire, in order to map the department's knowledge and information transfer network and assess the role of social capital in alleviating communication problems related to lack of access to the person(s) holding useful knowledge and to potential "editorial" activity of gatekeepers in the network.

Communication frequency is often related to information transfer (Borgatti & Li, 2009); accordingly, in this paper communication frequency (based on a five-day working week and the production rate of new information in the organization) is considered to reflect link strength between any two employees and is used to determine network density. The density of the network was calculated with UCINET 6 software (Borgatti, Everett, & Freeman, 2002), based on data collected during the first stage of research. The same software was used to process all other findings: the Quadratic Assignment Procedure (QAP) was used to correlate variables, while Multiple Regression Quadratic Assignment Procedure (MR-QAP) was applied, using as independent variables: a) relational and b) cognitive social capital and as

Communication Barriers and Social Capital

dependent variables: a) accessibility and b) lack of editorial gatekeeping activity. Personal interviews with all members of the network helped complete the picture.

Items exploring relational capital between employees (trust, personal relationship, mutual respect, peer support) were based on Kale et al. (2000), Levin and Cross (2004), Cousins et al. (2006) and Carey et al. (2011). Cognitive social capital is examined as the perceptions of employees on a) sharing knowledge norms, adapting questions by Mohr and Sohi (1995) and b) communication norms, based on factors suggested by Mattessich and Monsey (1992) as indicative of an open communication climate in the organization. Answers were rated on a five-point Likert scale, in which 1 depicted lack of social capital (negative phenomenon) and 5 a high social capital (positive phenomenon); the average of this set of questions was used for the overall assessment of social capital. Accessibility of network members sought as sources of knowledge and information was examined with items adapted from Levin and Cross (2004), with answers rated on a five-point Likert scale; respondents were also asked about the medium or media used, as an indication of the level of formality of their interactions. Items related to editorial gatekeeping activity were adapted from Roberts and O'Reilly (1974) and Mohr and Sohi (1995). All answers were rated on a five-point Likert scale (reverse scored). The average score for each set of questions was used for the overall assessment of each variable.

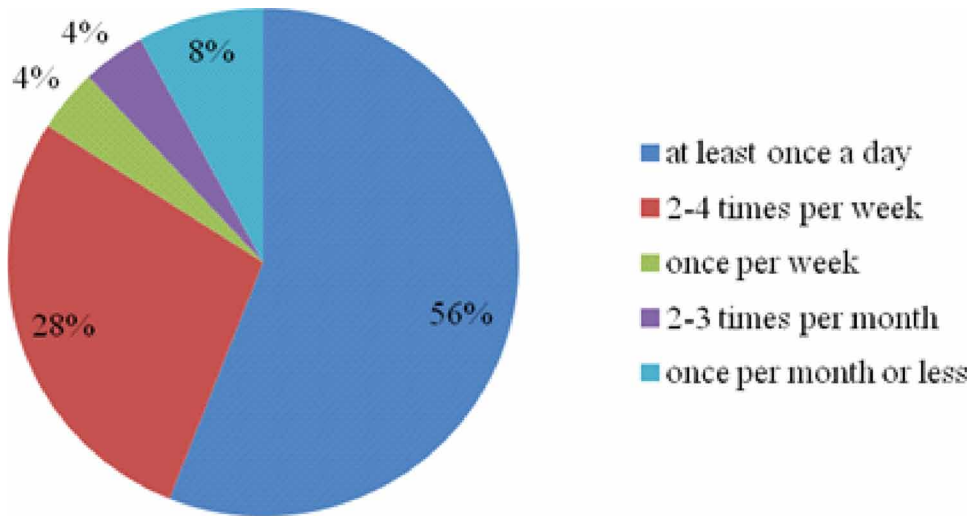
FINDINGS

Although a wide range of information is now available to all through the organization's intranet, during interviews most employees focused on their need to check their understanding of new knowledge and stated that they tend to mostly turn to their colleagues for any information needed rather than make use of the organization's electronic database. The need for information and new knowledge appears to be extremely high (Figure 1), as 56% of respondents seek information necessary to fulfill their tasks from one or more persons at least once a day; another 28% of employees turn to their colleagues for information twice to four times in a five-day working week, while only 16% of respondents seek information once a week or less often.

STRUCTURAL SOCIAL CAPITAL AND COMMUNICATION BARRIERS

Persons able to provide useful knowledge seem to be very hard to access, while the formal information transfer network (reflected in the organization chart of the old social security entity) is not successfully drawn on. The informal information

Figure 1. Frequency of information seeking



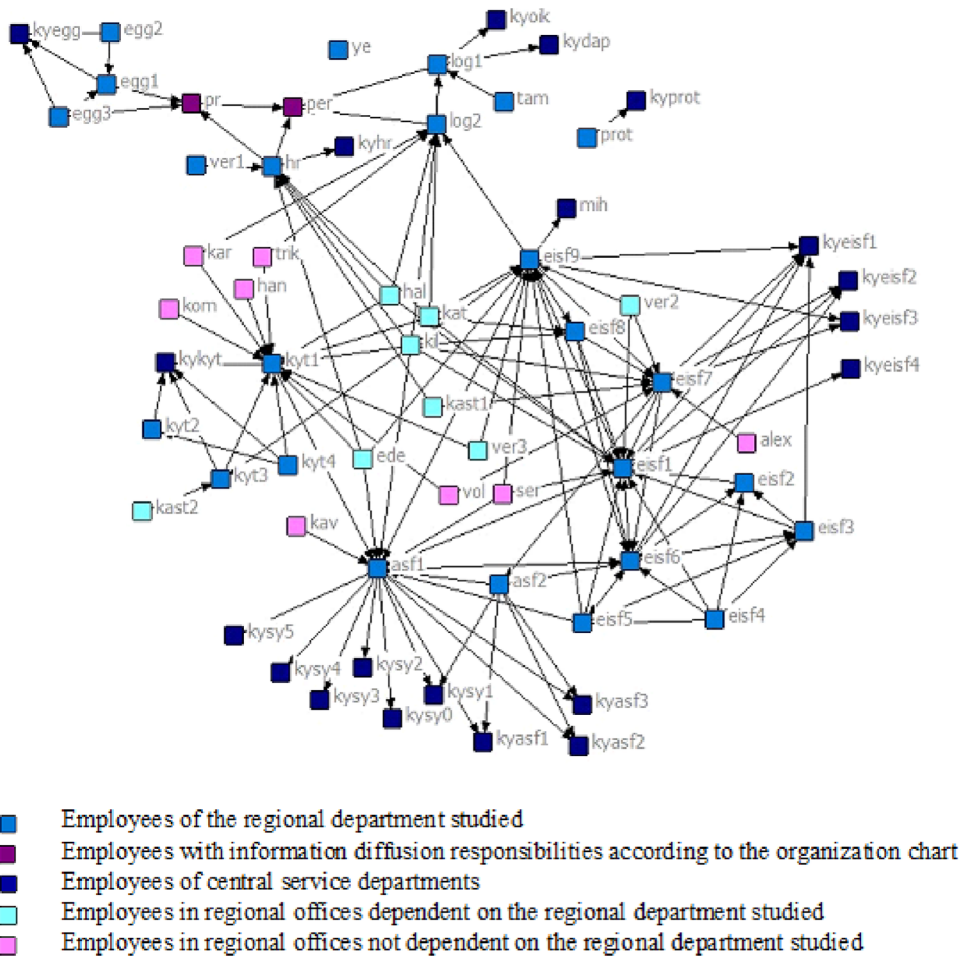
transfer network mapped was quite different from the one reflected in the formal organization chart. The central directorate responsible for providing all necessary information to regional services practically ceased to operate since new legislation came into effect on 01/01/2017, uniting most of Greek social security entities into one. The flow of knowledge and information according to the organization chart of the former social security entity follows the hierarchy from top to bottom, in the pyramid structure generally characterizing Greek public services (Sotirakou & Zeppou, 2005). The role of gatekeeper, responsible for transferring information that he or she judges necessary to employees, is officially assigned to the head of each regional department. No provision is made for horizontal communication between directorates, departments or regional offices.

Knowledge and information circulates among employees on a “pull” basis, as they contact on their own initiative the person or persons in possession of any relevant information each time they need it. The selection of who to turn to is based for the most part on relationships developed over time, hence social capital is proving to be an important factor to acquiring timely and valid information. These relationships clearly do not reflect the official organization chart. The information and knowledge seeking network is presented in Figure 2, as designed with Netdraw 2.141 application (Borgatti, 2002).

Connections between nodes show the person or persons to whom each employee in the regional department studied turns to in order to seek knowledge or information relevant to their work. The employees responsible for transmitting information according to the organization chart are clearly not central in the network, as very few

Communication Barriers and Social Capital

Figure 2. Knowledge and information seeking network designed with Netdraw 2.141 (Borgatti 2002)



members of the staff resort to them as sources of information. Instead, for the most part employees turn directly to their colleagues in the central service departments with similar duties and responsibilities. Furthermore, employees in several regional offices in different parts of the country are in contact between them to seek information, even if a communication channel is not reflected in the official organization chart.

Network density is low: it was calculated with UCINET 6.627 (Borgatti et al., 2002) at 25.2% for the direct network (employees in the regional department studied) and, if a wider network is considered (including ties with the organization central services acting as sources of information), density is even lower at 12.6% (Tables 1 and 2).

Lack of communication among network nodes as well as a clear failure in disseminating information through official channels has highlighted the need for employees to draw on their personal networks in order to acquire useful knowledge. Similarities of tasks and responsibilities as well as proximity (e.g. working at the same floor) were crucial to the formation of the knowledge and information flow network. This finding is consistent with prior literature, as physical proximity has been identified as an important factor affecting communication frequency (Borgatti & Cross, 2003). However, during the interview stage it was also understood that employees who were assigned to different tasks maintained the relationships they had developed at their previous post, thus profiting from a wider network in their pursuit of knowledge and information and achieving a more integrated view of the organization’s activities.

Thus, in relation to the first research proposition, it becomes evident that in the absence of a dense network of relations at the organizational level, individual structural capital contributes to the alleviation of problems related to accessibility and editorial gatekeeping.

RELATIONAL SOCIAL CAPITAL AND COMMUNICATION BARRIERS

In order to explore relational social capital in the network, relationships between respondents and the persons they contact for information relevant to their work was studied. Aspects of relational capital examined included the existence of personal contact that goes beyond a typical professional relationship; mutual respect; peer support; trust on the goodwill as well as the abilities of the persons sought for their

Table 1. Department network density

	Avg Value	Total	Std Deviation	Avg Wtd Degree
info_dep (density of regional department network)	0.252	151	0.981	6.040

Table 2. Information seeking network density

	Avg Value	Total	Std Deviation	Avg Wtd Degree
info_density (of the information seeking network)	0.126	260	0.684	5.652

Communication Barriers and Social Capital

knowledge and information in their possession. Using the UCINET 6 program, the contribution of relational social capital to minimizing problems of accessibility and problems of editorial gatekeeping in the network was assessed by correlating relational capital findings a) to those concerning the accessibility of persons in possession of useful knowledge and information and b) to those concerning incidents of selective transfer or even tampering with the initial information (editorial gatekeeping) and estimated accuracy of transferred information.

The findings confirm the second research proposition, since a higher level of relational social capital seems to alleviate problems of accessibility, leading to a greater availability of employees in possession of useful knowledge. Moreover, as relational social capital increases so does the perceived accuracy and quality of information received, thus relieving problems related to editorial gatekeeping.

More specifically, results show that there is a high positive correlation between relational social capital and accessibility (Pearson correlation coefficient 0.9810) and are statistically significant (Table 3). Multiple regression analysis, using relational social capital as independent variable and accessibility as dependent variable, reported a coefficient of determination R Squared value of 0.962 thus showing that the model fits the data well (96.2%).

Moreover, a strong relational capital leads to the use of the richest medium of communication available: a face to face conversation with employees working at the same location, telephone conversations or even use of social media with employees in different locations. In the absence of relational social capital, the respondents report difficulty in reaching the persons in possession of useful knowledge and information at the desired time; they also acknowledged that they are more reluctant to use rich media, favoring written communication which offers more time to ponder over the wording of their question and minimizes personal contact.

With regard to editorial gatekeeping in the network, an equally high positive correlation is evident between relational social capital and circumvention of editorial gatekeeping (Pearson correlation coefficient 0.9826), and results are also statistically significant (Table 4). Multiple regression analysis, using relational social capital as an independent variable and absence of editorial gatekeeping as a dependent variable, resulted to a coefficient of determination R Squared value of 0.966 thus showing that the model fits the data well (96.6%).

Table 3. Relational social capital and accessibility: QAP correlation results

	Obs Value	Significant	Average	Std Dev	Minimum	Maximum	Prop ³ 0	Prop £ 0	N Obs
Pearson Correlation	0.9810	0.0002	-0.0000	0.0224	-0.0266	0.1074	0.0002	1.0000	5000.0000

Table 4. Relational social capital and absence of editorial gatekeeping: QAP correlation results

	Obs Value	Significant	Average	Std Dev	Minimum	Maximum	Prop ³ 0	Prop [£] 0	N Obs
Pearson Correlation	0.9826	0.0002	-0.0001	0.0224	-0.0268	0.1202	0.0002	1.0000	5000.0000

When in need of specific knowledge or information, respondents prefer to turn to employees with whom they are in closer terms, feeling that they would be more likely to provide them any needed information more quickly and more accurately, even in cases when these employees have taken on another position in the organization. For most of the respondents, their relationship with their sources of information guarantees that the latter will grant the time needed to share their knowledge and will have the patience to give all additional information thereafter, in order to obtain the desired accuracy. Moreover, a closer relationship often leads to additional communication choices that transcend the typical professional context, such as the use of a personal phone number or a social media platform, further improving the timeliness of information. Friedkin’s research (1982) has also shown that strong ties were more effective in promoting information flow in all cases; in the same way, Reagans and McEvily (2003) have demonstrated that a strong tie between two members of the network positively affected knowledge transfer to a greater degree than a weak tie. Strong ties, being essential to increased availability, two-way communication, willingness and motivation to share one’s knowledge, are even more important when the knowledge to be transferred is tacit and complex (Hansen, 1999).

COGNITIVE SOCIAL CAPITAL AND COMMUNICATION BARRIERS

Cognitive social capital (seen as shared perceptions between employees about communication norms and information sharing) also appeared to positively influence accessibility and to reduce the occurrence of editorial gatekeeping, confirming the third research proposition. Within the scope of this aspect of social capital, respondents were questioned on their confidence that all useful information will be transferred by the people they are working together, the extent to which it is expected by employees to share any new information affecting their work, as well as open communication about issues that arise in the course of day-by-day work.

However, these shared perceptions seem to characterize personal relationships only and do not appear to be present in the entirety of the organization as a shared culture

Communication Barriers and Social Capital

and shared goals. Overall, as was evident during personal interviews, cognitive social capital is restricted to individuals, developed within the organization on employees' own initiative. In contrast, it seems that the social climate at the organization level, as perceived by the interviewees, is marked by absence of structures, norms or rules (official or unwritten) that promote sharing of knowledge or information and open communication within the organization.

Using the UCINET 6 program, the contribution of cognitive social capital to minimizing problems of accessibility and problems of editorial gatekeeping in the network was assessed by correlating cognitive capital findings a) to those concerning the accessibility of persons in possession of useful knowledge and information and b) to those concerning incidents of selective transfer or even tampering with the initial information (editorial gatekeeping) and estimated accuracy of transferred information.

According to the findings, a higher level of cognitive social capital seems to lead to a greater availability of employees in possession of useful knowledge. Moreover, as cognitive social capital increases so increases the perceived accuracy of information received.

Results show that there is a high positive correlation between cognitive social capital and accessibility (Pearson correlation coefficient 0.9875) and are statistically significant (Table 5). Multiple regression analysis, using cognitive social capital as independent variable and accessibility as dependent variable, reported a coefficient of determination R Squared value of 0.975 thus showing that the model fits the data well (97.5%).

A different geographical location and communication overload at nodes important to the information flow network –their central role mostly due to their position in the organization hierarchy and their subsequent function as intermediaries bridging structural holes- significantly affect gaining access to these nodes and the variety of communication channels used. However, employees in possession of useful knowledge are more easily accessible when there is a convergence in perceptions and expectations regarding communication norms and information sharing between them and those who turn to them in pursuit of information. The use of richer media, which allow immediate feedback, personalization and richness of information conveyed, contributes to further achieve common meanings (Daft & Lengel, 1986), improving

Table 5. Cognitive social capital and accessibility: QAP correlation results

	Obs Value	Significant	Average	Std Dev	Minimum	Maximum	Prop 3 0	Prop £ 0	N Obs
Pearson Correlation	0.9875	0.0002	0.0004	0.0225	-0.0265	0.1544	0.0002	1.0000	5000.0000

communication effectiveness. Furthermore, in-depth interviews with the respondents revealed that when there were similar perceptions regarding information sharing, an unofficial formality was established in their interactions –e.g. an agreement to be available at a specific day and time each week. In the same way, Mohr and Sohi’s research (1995) showed that the existence of information sharing norms in a supply chain led to a higher degree of formality of communication flows, a finding that refuted their initial hypothesis.

With regard to editorial gatekeeping in the network, an equally high positive correlation is evident between cognitive social capital and circumvention of editorial gatekeeping (Pearson correlation coefficient 0.9854), and results are also statistically significant (Table 6). Multiple regression analysis, using cognitive social capital as an independent variable and absence of editorial gatekeeping as a dependent variable, resulted to a coefficient of determination R Squared value of 0,971 thus showing that the model fits the data well (97.1%).

Accumulation of relational and cognitive social capital contributes to increased availability of employees in possession of useful knowledge and to the containment of editorial gatekeeping phenomena, such as withholding or distortion of information, thus improving communication effectiveness.

SOLUTIONS AND RECOMMENDATIONS

As employees’ needs for new information were particularly high, a greater deal of communication was required in order to be able to carry through with their tasks and to convey information to citizens. The absence of a dense network seems to significantly hinder the flow of information. A very small number of employees appeared to have direct access to people in possession of useful knowledge, and respondents did not have a clear picture of a wider network so that alternative sources of information would be apparent. Furthermore, information flow from central administration to regional departments seemed to be disrupted at nodes acting as gatekeepers at the organization’s central services, so that even more communication (repeated questions and requests by employees) was required to get essential information.

Table 6. Cognitive social capital absence of editorial gatekeeping: QAP correlation results

	Obs Value	Significant	Average	Std Dev	Minimum	Maximum	Prop 3 0	Prop £ 0	N Obs
Pearson Correlation	0.9854	0.0002	-0.0003	0.0220	-0.0267	0.1286	0.0002	1.0000	5000.0000

Communication Barriers and Social Capital

The extent to which members' roles and relationships are clearly defined in an organizational network is an important factor in mapping connections between nodes. An organizational structure can be seen as a pattern of relationships between different positions, which are linked to specific organizational roles and tend to dictate typical communication flows (Monge & Contractor, 2003). Employees higher in the organization's hierarchy, for instance, are more likely to enjoy increased access to more information (Cross & Cummings, 2004). Structural social capital, namely the existence of strong links between nodes in the information transfer network, was found to be essential in alleviating problems of accessibility and of editorial gatekeeping phenomena. As a result of the absence of structural capital within the organization, employees in possession of useful knowledge were not easily accessible and the flow of information was interrupted at nodes acting as gatekeepers. Information sharing depended on each employee's personal network instead of relying on official, organizational channels, so that the unofficial information transfer network was very different from the one reflected in the organization chart.

A distinction is often made between formal networks (imposed, designated in the organization official structure) and informal ones (emergent, ad hoc networks), which reflect employees' personal contacts and sources of information (Allen et al., 2007). The difference may not be as marked in modern companies, where new organizational structures tend to replace top-down hierarchies and new technologies offer more and richer communication channels (Monge & Contractor, 2001). It is, however, still very noticeable in the Greek public sector, which typically maintains an ineffective structure of multiple hierarchical levels, and lacks structures that would encourage horizontal interdepartmental communication (OECD, 2011).

Allen et al. (2007) argue that the efficiency of information dissemination within the organization improves when formal structures take into account the emergence of informal networks; this would allow to identify and use to advantage staff members with a pivotal role in the dissemination of information, as well as to locate contingent structural holes, improving the efficiency of formal networks.

The absence of social capital in the wider network is equally prominent in its relational and cognitive aspects. A cohesive, close network might contribute to the development of factors conducive to knowledge sharing such as norms, trust and cooperation (Cross & Cummings, 2004). Furthermore, a convergence of views as to the desired quality and timeliness of information in the organization as a whole would improve the efficiency of knowledge flow (Hult, Ketchen, & Slater, 2004). Building new communication channels through personal initiative, establishing and maintaining good relationships among employees, and developing shared perceptions about communication and information sharing certainly seemed to have helped improve the effectiveness of knowledge and information flows. As the examined network lacks cohesiveness, however, facets of social capital have only

been developed between individual employees and as a result cannot be tapped by others. Individual social capital should then form the basis to build organizational social capital (Inkpen & Tsang, 2005).

Operations design in the organization has an impact on interaction opportunities between departments and individual employees; an excessive centralization of decision-making and control can adversely affect interdepartmental collaboration (Brass, Galaskiewicz, Greve, & Tsai, 2004). The concept of co-membership has also been illustrated as an important factor to knowledge transfer (Peng, 2019). Putting together cross-departmental teams offers a way to span structural holes in the networks and, as a result, to gain access to more timely and diverse information (Burt, 2000). More direct interaction opportunities may additionally affect the gatekeepers' role in the organizational network, as the development of closer relationships with the "gated" helps improve the latter's salience, and thus encourages a mutual exchange of information (Erzikova, 2018). Moreover, when designing work processes it is important that the time and cost required for knowledge sharing activities are taken into account (Riege, 2005). Access to physical resources, supportive policies and innovative leadership are also important in building and maintaining sustainable knowledge networks in the public sector (Dawes et al., 2009).

Human Resources management has a central role in the development of an environment that encourages the building and strengthening of relationships among employees (Zupan & Kaše, 2007) and, therefore, to the accumulation of social capital in the organization. Work design and HR practices such as cross-functional teamwork or planned rotation between different assignments affect the frequency and intensity of social interactions among employees and can be used to help enhance relationships (Kaše, Paauwe, & Zupan, 2009). Socialization, interaction and communication among individuals helps build relationships based on trust and respect in the network (Cousins et al., 2006). It is more likely for trust to be built between employees who have the opportunity to work together or interact with each other; trust can be further enhanced through incentives that aim at group rather than individual results (Collins & Smith, 2006).

Human resources management practices can also contribute to the development of shared perceptions on official and informal policies, practices and processes of the organization, thus laying the foundations for the development of a strong organizational climate (Bowen & Ostroff, 2004). Group training, for instance, offers the opportunity to get a clearer view of each other's skills and knowledge, creating shared systems of meaning (Kaše et al., 2009). The establishment of a robust internal communication framework is likewise indispensable to successful knowledge sharing across organizational nodes; eliminating internal communication barriers augments an organization's ability to transfer complex knowledge thus improving employees' capabilities (Ndelela, 2014).

FUTURE RESEARCH DIRECTIONS

This chapter examined a small part of a wider information transfer network within an organization, focusing on nodes actively involved in seeking and providing knowledge and information. For a clearer picture of the complex relationships developed in a knowledge transfer network, research should be expanded to the whole of the organization. Moreover, studying the information transfer network at a later time would allow the researchers to identify changes brought about after the new organization structure has fully been established, particularly in the informal information transfer network. Studying more similar networks in the public sector would allow comparing data and results, increasing the external validity of the study (Voss et al., 2002).

The transition from individual to organizational social capital is also an important aspect that calls for further study. Tantardini and Kroll (2015) have stressed the need for a long-term strategy and organizational support in order for social capital to grow at the organizational level in the public sector, comparing it to the culture or climate of an organization. Organizational social capital has been also shown to play a significant role in providing intrinsic motivation and in improving job involvement for public sector employees (Kroll & Tantardini, 2019).

Furthermore, as the importance of improving performance and results of public services has been well recognized (Kearney & Berman, 2018), it would be of particular interest to study the contribution of social capital and the consequent alleviation of communication barriers to information quality. Aspects of information quality such as the reliability (completeness, free-of-error), and timeliness of information received within the internal knowledge transfer network (cf. Kahn, Strong, & Wang, 2002; Lee, Strong, Kahn, & Wang, 2002) are critical in providing quality services to citizens.

CONCLUSION

In this chapter, the contribution of social capital in improving communication within a public sector organization has been explored. Studying the knowledge and information transfer network in a social security entity regional department has made it possible to assess the role of structural, relational and cognitive social capital in mitigating problems of accessibility of persons in possession of useful knowledge and problems of editorial gatekeeping in the organizational network.

Building new communication channels through personal initiative has ensured a more effective knowledge and information flow in the examined regional department. Communication is a key factor to the creation or relational social capital; however, the

accumulation of relational capital leads in turn to an increase in close interactions and enhances communication, promoting information sharing and knowledge exchange. Establishing and maintaining close, trusting relationships among employees was shown to lead to increased availability of persons who are sought as sources of knowledge and information; it also guarantees that information will be passed on with more accuracy, free of distortions or omission of potentially important details. Shared perceptions and expectations regarding communication and information sharing norms within the organization also seemed to bring about a significant improvement to problems of access to employees in possession of useful knowledge as well as problems of editorial gatekeeping in the information flow network.

Structural, relational and cognitive social capital at a personal level was found to alleviate problems of accessibility as well as problems related to the control of the flow of information by gatekeepers, arbitrarily abridging or distorting messages. The lack of organizational social capital has highlighted the importance of individual social capital of employees in overcoming communication barriers.

REFERENCES

- Abrams, L. C., Cross, R., Lesser, E., & Levin, D. Z. (2003). Nurturing interpersonal trust in knowledge-sharing networks. *The Academy of Management Executive*, 17(4), 64–77. doi:10.5465/ame.2003.11851845
- Allameh, S. M. (2018). Antecedents and consequences of intellectual capital: The role of social capital, knowledge sharing and innovation. *Journal of Intellectual Capital*, 19(5), 858–874. doi:10.1108/JIC-05-2017-0068
- Allen, J., James, A. D., & Gamlen, P. (2007). Formal versus informal knowledge networks in R&D: A case study using social network analysis. *R & D Management*, 37(3), 179–196. doi:10.1111/j.1467-9310.2007.00468.x
- Barzilai-Nahon, K. (2009). Gatekeeping: A critical review. *Annual Review of Information Science & Technology*, 43(1), 1–79. doi:10.1002/aris.2009.1440430117
- Borgatti, S. P. (2002). *NetDraw: Graph Visualization Software*. Lexington, KY: Analytic Technologies.
- Borgatti, S. P., & Cross, R. (2003). A relational view of information seeking and learning in social networks. *Management Science*, 49(4), 432–445. doi:10.1287/mnsc.49.4.432.14428
- Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). *UCINET 6 for Windows: Software for Social Network Analysis*. Lexington, KY: Analytic Technologies.

Communication Barriers and Social Capital

- Borgatti, S. P., & Foster, P. C. (2003). The network paradigm in organizational research: A review and typology. *Journal of Management*, 29(6), 991–1013. doi:10.1016/S0149-2063(03)00087-4
- Borgatti, S. P., & Li, X. (2009). On social network analysis in a supply chain context. *The Journal of Supply Chain Management*, 45(2), 5–22. doi:10.1111/j.1745-493X.2009.03166.x
- Bowen, D. E., & Ostroff, C. (2004). Understanding HRM–firm performance linkages: The role of the “strength” of the HRM system. *Academy of Management Review*, 29(2), 203–221.
- Brass, D. J., Galaskiewicz, J., Greve, H. R., & Tsai, W. (2004). Taking stock of networks and organizations: A multilevel perspective. *Academy of Management Journal*, 47(6), 795–817.
- Burt, R. S. (1997). The contingent value of social capital. *Administrative Science Quarterly*, 42(2), 339–365. doi:10.2307/2393923
- Burt, R. S. (2000). The network structure of social capital. *Research in Organizational Behavior*, 22, 345–423. doi:10.1016/S0191-3085(00)22009-1
- Carey, S., Lawson, B., & Krause, D. R. (2011). Social capital configuration, legal bonds and performance in buyer–supplier relationships. *Journal of Operations Management*, 29(4), 277–288. doi:10.1016/j.jom.2010.08.003
- Choi, T. Y., & Kim, Y. (2008). Structural embeddedness and supplier management: A network perspective. *The Journal of Supply Chain Management*, 44(4), 5–13. doi:10.1111/j.1745-493X.2008.00069.x
- Choi, Y. (2016). The impact of social capital on employees’ knowledge-sharing behavior: An empirical analysis of US federal agencies. *Public Performance & Management Review*, 39(2), 381–405. doi:10.1080/15309576.2015.1108795
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95–S120. doi:10.1086/228943
- Collins, C. J., & Smith, K. G. (2006). Knowledge exchange and combination: The role of human resource practices in the performance of high-technology firms. *Academy of Management Journal*, 49(3), 544–560. doi:10.5465/amj.2006.21794671
- Colnar, S., & Dimovski, V. (2017). Knowledge management initiatives benefits for the Slovenian public sector. *Management*, 22(Special Issue), 145–161.

- Cousins, P. D., Handfield, R. B., Lawson, B., & Petersen, K. J. (2006). Creating supply chain relational capital: The impact of formal and informal socialization processes. *Journal of Operations Management*, 24(6), 851–863. doi:10.1016/j.jom.2005.08.007
- Cross, R., & Cummings, J. N. (2004). Tie and network correlates of individual performance in knowledge-intensive work. *Academy of Management Journal*, 47(6), 928–937.
- Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science*, 32(5), 554–571. doi:10.1287/mnsc.32.5.554
- Daft, R. L., Lengel, R. H., & Trevino, L. K. (1987). Message equivocality, media selection, and manager performance: Implications for information systems. *Management Information Systems Quarterly*, 11(3), 355–366. doi:10.2307/248682
- Dawes, S. S., Cresswell, A. M., & Pardo, T. A. (2009). From “Need to Know” to “Need to Share”: Tangled Problems, Information Boundaries, and the Building of Public Sector Knowledge Networks. *Public Administration Review*, 69(3), 392–402. doi:10.1111/j.1540-6210.2009.01987_2.x
- Dennis, A. R., Fuller, R. M., & Valacich, J. S. (2008). Media, tasks, and communication processes: A theory of media synchronicity. *Management Information Systems Quarterly*, 32(3), 575–600. doi:10.2307/25148857
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532–550. doi:10.5465/amr.1989.4308385
- Erzikova, E. (2018). Gatekeeping. In R. L. Heath & W. Johansen (Eds.), *The International Encyclopedia of Strategic Communication* (pp. 1–6). Hoboken, NJ: John Wiley & Sons Limited. doi:10.1002/9781119010722.iesc0080
- Freeman, L. C. (1978). Centrality in social networks conceptual clarification. *Social Networks*, 1(3), 215–239. doi:10.1016/0378-8733(78)90021-7
- Friedkin, N. E. (1982). Information flow through strong and weak ties in intraorganizational social networks. *Social Networks*, 3(4), 273–285. doi:10.1016/0378-8733(82)90003-X
- García-Villaverde, P. M., Parra-Requena, G., & Molina-Morales, F. X. (2018). Structural social capital and knowledge acquisition: Implications of cluster membership. *Entrepreneurship and Regional Development*, 30(5-6), 530–561. doi:10.1080/08985626.2017.1407366

Communication Barriers and Social Capital

- Granovetter, M. (1983). The strength of weak ties: A network theory revisited. *Sociological Theory*, 1(1), 201–233. doi:10.2307/202051
- Haas, A. (2015). Crowding at the frontier: Boundary spanners, gatekeepers and knowledge brokers. *Journal of Knowledge Management*, 19(5), 1029–1047. doi:10.1108/JKM-01-2015-0036
- Hallahan, K., Holtzhausen, D., Van Ruler, B., Verčič, D., & Sriramesh, K. (2007). Defining strategic communication. *International Journal of Strategic Communication*, 1(1), 3–35. doi:10.1080/15531180701285244
- Hanneman, R. A., & Riddle, M. (2005). *Introduction to social network methods*. Riverside, CA: University of California.
- Hansen, M. T. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly*, 44(1), 82–111. doi:10.2307/2667032
- Hansen, M. T. (2002). Knowledge networks: Explaining effective knowledge sharing in multiunit companies. *Organization Science*, 13(3), 232–248. doi:10.1287/orsc.13.3.232.2771
- Hult, G. T. M., Ketchen, D. J., & Slater, S. F. (2004). Information processing, knowledge development and strategic supply chain performance. *Academy of Management Journal*, 47(2), 241–253.
- Inkpen, A. C., & Tsang, E. W. (2005). Social capital, networks, and knowledge transfer. *Academy of Management Review*, 30(1), 146–165. doi:10.5465/amr.2005.15281445
- Inkpen, A. C., & Tsang, E. W. (2016). Reflections on the 2015 decade award - Social Capital, networks, and knowledge transfer: An emergent stream of research. *Academy of Management Review*, 41(4), 573–588. doi:10.5465/amr.2016.0140
- Kahn, B. K., Strong, D. M., & Wang, R. Y. (2002). Information quality benchmarks: Product and service performance. *Communications of the ACM*, 45(4), 184–192. doi:10.1145/505248.506007
- Kale, P., Singh, H., & Perlmutter, H. (2000). Learning and protection of proprietary assets in strategic alliances: Building relational capital. *Strategic Management Journal*, 21(3), 217–237. doi:10.1002/(SICI)1097-0266(200003)21:3<217::AID-SMJ95>3.0.CO;2-Y
- Kaše, R., Paauwe, J., & Zupan, N. (2009). HR practices, interpersonal relations, and intrafirm knowledge transfer in knowledge-intensive firms: A social network perspective. *Human Resource Management*, 48(4), 615–639. doi:10.1002/hrm.20301

- Kearney, R. C., & Berman, E. M. (2018). Introduction. In R. C. Kearney (Ed.), *Public sector performance: management, motivation, and measurement* (pp. 1–5). New York, NY: Routledge. doi:10.4324/9780429497964-1
- Kroll, A., & Tantardini, M. (2019). Motivating and retaining government employees: The role of organizational social capital. *International Public Management Journal*, 22(2), 232–253. doi:10.1080/10967494.2017.1367341
- Lee, Y. W., Strong, D. M., Kahn, B. K., & Wang, R. Y. (2002). AIMQ: A methodology for information quality assessment. *Information & Management*, 40(2), 133–146. doi:10.1016/S0378-7206(02)00043-5
- Levin, D. Z., & Cross, R. (2004). The strength of weak ties you can trust: The mediating role of trust in effective knowledge transfer. *Management Science*, 50(11), 1477–1490. doi:10.1287/mnsc.1030.0136
- Lin, N. (2008). A network theory of social capital. In D. Castiglione, J. W. Van Deth, & G. Wolleb (Eds.), *The handbook of social capital* (pp. 50–69). London: Oxford University Press.
- Lin, N. (2017). Building a network theory of social capital. In N. Lin, K. S. Cook, & R. S. Burt (Eds.), *Social capital: Theory and research* (pp. 3–28). London: Taylor & Francis Group. doi:10.4324/9781315129457-1
- Mattessich, P. W., & Monsey, B. R. (1992). *Collaboration: what makes it work. A review of research literature on factors influencing successful collaboration*. Saint Paul, MN: Amherst H. Wilder Foundation.
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20(3), 709–734. doi:10.5465/amr.1995.9508080335
- Mittal, S. (2018). Barriers to communication. *International Journal of Advanced Research and Development*, 3(1), 243–245.
- Mohr, J. J., & Sohi, R. S. (1995). Communication flows in distribution channels: Impact on assessments of communication quality and satisfaction. *Journal of Retailing*, 71(4), 393–415. doi:10.1016/0022-4359(95)90020-9
- Monge, P. R., & Contractor, N. S. (2001). Emergence of communication networks. In F. Jablin & L. Putnam (Eds.), *The new handbook of organizational communication: Advances in theory, research, and methods* (pp. 440–502). Thousand Oaks, CA: SAGE Publications, Inc. doi:10.4135/9781412986243.n12

Communication Barriers and Social Capital

Monge, P. R., & Contractor, N. S. (2003). *Theories of communication networks*. Oxford: Oxford University Press.

Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23(2), 242–266. doi:10.5465/amr.1998.533225

Ndlela, M. N. (2014). Critical success factors for effective knowledge sharing: Integrating intra-organizational communication and KM tools. In *European Conference on Knowledge Management* (vol. 2, p. 724). Sonning Common: Academic Conferences International Limited.

OECD. (2011). *Greece: Review of the Central Administration, OECD Public Governance Reviews*. OECD Publishing. Retrieved April 10, 2019 from https://www.oecd-ilibrary.org/governance/greece-review-of-the-central-administration_9789264102880-en

Pang, A., Shin, W., Lew, Z., & Walther, J. B. (2018). Building relationships through dialogic communication: Organizations, stakeholders, and computer-mediated communication. *Journal of Marketing Communications*, 24(1), 68–82. doi:10.1080/13527266.2016.1269019

Pee, L. G., & Kankanhalli, A. (2016). Interactions among factors influencing knowledge management in public-sector organizations: A resource-based view. *Government Information Quarterly*, 33(1), 188–199. doi:10.1016/j.giq.2015.06.002

Peng, G. (2019). Co-membership, networks ties, and knowledge flow: An empirical investigation controlling for alternative mechanisms. *Decision Support Systems*, 118, 83–90. doi:10.1016/j.dss.2019.01.005

Pieterse, W., & Ebbers, W. (2008). The use of service channels by citizens in the Netherlands: Implications for multi-channel management. *International Review of Administrative Sciences*, 74(1), 95–110. doi:10.1177/0020852307085736

Podolny, J. M., & Baron, J. N. (1997). Resources and relationships: Social networks and mobility in the workplace. *American Sociological Review*, 62(5), 673–693. doi:10.2307/2657354

Reagans, R., & McEvily, B. (2003). Network structure and knowledge transfer: The effects of cohesion and range. *Administrative Science Quarterly*, 48(2), 240–267. doi:10.2307/3556658

Riege, A. (2005). Three-dozen knowledge-sharing barriers managers must consider. *Journal of Knowledge Management*, 9(3), 18–35. doi:10.1108/13673270510602746

- Roberts, K. H., & O'Reilly, C. A. (1974). Failures in upward communication in organizations: Three possible culprits. *Academy of Management Journal*, 17(2), 205–215.
- Schramm, W. (1963). Communication Research in the United States. In W. Schramm (Ed.), *The Science of Human Communication. New Directions and New Findings in Communication Research* (pp. 1–16). New York, NY: Basic Books Inc.
- Schramm, W. (1971). The nature of communication between humans. In W. Schramm & D. F. Roberts (Eds.), *The process and effects of mass communication* (pp. 3–53). Urbana, IL: University of Illinois Press.
- Sethi, D., & Seth, M. (2009). Interpersonal communication: Lifeblood of an organization. *The IUP Journal of Soft Skills*, 3(3), 32–40.
- Shannon, C. E. (1948). A mathematical theory of communication. *The Bell System Technical Journal*, 27, 379–423, 623–656.
- Sotirakou, T., & Zeppou, M. (2005). How to align Greek civil service with European Union public sector management policies: A demanding role for HR managers in the contemporary public administration context. *International Journal of Public Sector Management*, 18(1), 54–82. doi:10.1108/09513550510576152
- Stuart, I., McCutcheon, D., Handfield, R., McLachlin, R., & Samson, D. (2002). Effective case research in operations management: A process perspective. *Journal of Operations Management*, 20(5), 419–433. doi:10.1016/S0272-6963(02)00022-0
- Tantardini, M., & Kroll, A. (2015). The role of organizational social capital in performance management. *Public Performance & Management Review*, 39(1), 83–99. doi:10.1080/15309576.2016.1071163
- Thomas, A., & Paul, J. (2019). Knowledge transfer and innovation through university-industry partnership: An integrated theoretical view. *Knowledge Management Research and Practice*, 17(4), 436–448. doi:10.1080/14778238.2018.1552485
- Togola, A., Ahmed, S., & Jadaan, T. (2019). Barriers of Knowledge Transfer between Globally Distributed Teams in ICT Product Development. *Proceedings of the 52nd Hawaii International Conference on System Sciences*. Retrieved March 3, 2019 from <http://hdl.handle.net/10125/59993>
- Tsai, W., & Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of Management Journal*, 41(4), 464–476.

Communication Barriers and Social Capital

- Tushman, M. L., & Katz, R. (1980). External communication and project performance: An investigation into the role of gatekeepers. *Management Science*, 26(11), 1071–1085. doi:10.1287/mnsc.26.11.1071
- Varey, R. J. (2000). A critical review of conceptions of communication evident in contemporary business and management literature. *Journal of Communication Management (London)*, 4(4), 328–340. doi:10.1108/eb023530
- Villena, V. H., Revilla, E., & Choi, T. Y. (2011). The dark side of buyer–supplier relationships: A social capital perspective. *Journal of Operations Management*, 29(6), 561–576. doi:10.1016/j.jom.2010.09.001
- Voss, C., Tsikriktsis, N., & Frohlich, M. (2002). Case research in operations management. *International Journal of Operations & Production Management*, 22(2), 195–219. doi:10.1108/01443570210414329
- Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications* (Vol. 8). Cambridge: Cambridge University Press. doi:10.1017/CBO9780511815478
- Yin, R. K. (1981). The case study as a serious research strategy. *Science Communication*, 3(1), 97–114.
- Zins, C. (2007). Conceptual approaches for defining data, information, and knowledge. *Journal of the American Society for Information Science and Technology*, 58(4), 479–493. doi:10.1002/asi.20508
- Zupan, N., & Kaše, R. (2007). The role of HR actors in knowledge networks. *International Journal of Manpower*, 28(3/4), 243–259. doi:10.1108/01437720710755236

KEY TERMS AND DEFINITIONS

Cognitive Social Capital: Resources related to shared systems of meaning: shared perceptions and representations, communication codes, shared norms and expectations.

Communication Noise: Any barrier (physical/technical, physiological, psychological, semantic) that disrupts communication

Gatekeeper: A person in a position to filter, control access to information, and manage information and knowledge flows in a network.

Media Richness: The degree to which a communication medium allows to transmit a variety of cues apart from verbal ones (e.g., tone of voice, accent, emphasis, gestures, facial expressions, stance, etc.) and to provide immediate feedback.

Network Density: The number of actual ties between nodes in a network, relative to the number of all possible ties. In a dense network, the number of connections is close to the maximal number of potential ties.

Relational Social Capital: Resources related to close relationships of trust, respect, mutual obligations, and expectations.

Social Network: A structure consisted of nodes (individuals, groups or more complex entities, such as companies and organizations) which are interconnected through some kind of interaction or relationship.

Structural Social Capital: Resources related to one's position and connections in a social network.

Chapter 5

The Role of Middle Managers in Knowledge Creation and Diffusion: An Examination in Greek Organizations

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ABSTRACT

The role of middle managers in modern management theory has been already recognized, and this role is considered very important for the functioning of an organization. They have managed to be involved in many aspects of managing, and one of them is the novice field of knowledge management. In this chapter, the role of middle managers in knowledge creation and diffusion is explored and analyzed. A theoretical model of four middle managers' roles affecting the strategy of an organization is examined. The model was tested through a questionnaire in a sample of 241 middle managers of Greek organizations. After the analysis of the data collected, it was deduced that the theoretical model utilized was validated in the sample.

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INTRODUCTION

Middle managers (MMs) seem to have established an important position in modern management, functioning as facilitators between lower levels and top management of the organization, enhancing and facilitating the communications channels between these different levels.

Knowledge management (KM) is also an important and innovative aspect that has occupied the management theory and practice in the last years. Perhaps no concept has profoundly affected the discipline of management in recent years as the idea of KM (Psychogios, Alexandis & Onofrei, 2008). Its interconnection with information systems and business administration and the efforts made to diffuse knowledge inside an organization, have introduced a valuable asset to the field of management.

Evaluating and understanding the role of MMs in the context of KM is crucial for contemporary organizations as in today's business environment, KM has become a lifeline for organizations. While several authors recognize the important role of MMs in knowledge management and transfer, research on this topic is still in its embryonic stage and empirical studies are scarce (Al-Hakim & Hassan, 2011b; Carty & Walsh, 2007; Costanzo & Tzoumpa, 2008; Delmestri & Walgenbach, 2005; Janczak, 2004). For the above reasons, it is important to assess the role of MMs in knowledge creation and diffusion and the present work is another contribution in these efforts.

In this study, a theoretical model which includes four roles (champions, synthesizers, facilitators, implementers) of the MMs as a result of their influence in the existing strategy of the organization, is presented. These four roles were analyzed in twenty criteria, representing ways of actions and behavior of the managers in KM practices. The practical implementation of this model was tested through a questionnaire addressed in two hundred and forty-one MMs of Greek (public and private ones) organizations. The questionnaire introduced by Floyd & Wooldridge (1996) was utilized, with a purpose to access the dimensions of knowledge creation and diffusion.

BACKGROUND

MMs and Their Role

While in the 1970s Chandler (1977) emphasized that MMs' jobs cover exclusively the supervision of the lower hierarchical levels, now a large body of literature discusses their role in other fields. Furthermore, their jobs contain the integration of "the intentions of top-level managers with the day-to-day operational realities

experienced by first-level managers” (Ireland 1992:18). Schlesinger & Oshry (1984) differentiated several possible integration levels (between top-level managers with the day-to-day operational realities experienced by first-level managers) containing the following categories: no integration, information sharing, assimilating information, joint strategic planning and, mutual consultation, and power bloc.

Regarding their position in the organization, Staehle & Schirmer (1992:70) emphasize that MMs are “employees who have at least two hierarchical levels under them and all *staff employees* with responsibility for managing personnel”. Akhavan, Jafari & Fathian (2006) argued that the MMs could be defined as managers holding positions that fall within a range of two levels below the head of the organization and one level above supervisory staff or professional workers

However, in the last 30 years, there has not been a universally accepted definition regarding the term MM. Bower (1986) states that MMs are the only ones within their organization who are in a position to decide whether issues are being considered in the proper context. From another point of view, Uytterhoeven (1989:136) argues that a MM is someone “who is responsible for a particular business unit at the intermediate level of the corporate hierarchy”. Ireland (1992) provides a more concrete definition regarding MMs and describes them as employees working between an organization’s first-level and top-level managers.

In general, it can be concluded that the position of the middle administrative executive, is located right in the middle of the interaction between strategic goal and organizational action. Hence, MMs, having interactions with both the upper and lower level of the organization, can influence the configuration of strategy in both the upward and downward directions. In other words, they are in the right position to match the strategic level of action with the organizational one and to affect the shaping of the evolving strategic context.

From the above mentioned, it is obvious that MMs are functioning as a link between the senior management and the lower levels of the organization. Due to involvement in the day-to-day running of a business, MMs have the opportunity to report valuable information and suggestions from the inside of an organization. Moreover, MMs function as a channel of communication within the organization, as they pass on major decisions of executives and the main goals of an organization to lower levels of staff.

MMs’ main duty is to implement company strategy in the most efficient way. Their duties include creating an effective working environment, administrating the work process, making sure it is compliant with the organization’s requirements, leading people and reporting to the highest level of management (Zhang, Tsui, Song, Li & Jia, 2008). Hence, it is obvious that MMs are transmitters of knowledge and information between different administrative levels of the organization.

KM

Although the Greek philosophers (mainly Plato, Aristotle and Socrates) were the first to recognize the value of knowledge, and they attempted to analyze its components, only in the last years it has been realized that the possible benefits from exploiting knowledge could be valuable in the enterprise level too. This was due to several reasons and some of them are reported below.

The extended spreading of information in the last decade of the 20th century and at the beginning of the 21st has transformed the world into a smaller entity. The evolution in communication technologies and mostly internet, have affected every aspect of human existence. As the world had become and still is, smaller and easily accessible from many people, information and knowledge are expanding at an even bigger pace. Drucker (1993) has precluded the arrival of a new economy and society, calling it «knowledge society» and as Mokyr (2002) and Leyderdorff (2003) stated, we are becoming a ‘‘knowledge economy’’ and a ‘‘knowledge society’’. More specifically, Drucker (1993) reported that we are entering or have already entered in the knowledge society, in which the main economic resource is knowledge and where knowledge worker will play a major part. It is true that in the knowledge-based economy era, the superior organizations depend more on its knowledge-based resources (Choi, Poon, & Davis, 2008; Ho, 2008). Knowledge is now globally accepted as a driving force of economic development and a powerful factor of social relationships’ configuration (Geisler, 2008).

An established discipline since 1991, KM includes courses taught in the fields of business administration, information systems, management, library, and information sciences (Kim & Gong, 2009; Yang, Zheng, & Viere, 2009). Many private and public organizations are now capable, due to the technological evolution, to codify, store and to process enormous quantities of information and data, originated from the recording of their internal processes, as from the observation and the study of their external (direct and not) environment.

Nonaka & Takeuchi (1995) have formed the principles and perspectives of business knowledge and produced and signaled the beginning of exploiting knowledge from all the organizations. First of all, they defined KM as an activity, which includes the abilities and experiences of the organizations’ members, the innovation and creativity potential, the optimal business practices, the patents, the knowledge that the organizations have accumulated for the market and its clients, as well as the knowledge from its competitors. They also highlighted that business knowledge is not only the sum of its members’ knowledge, but the modern business environment demands the full exploitation of the collective business knowledge of a company. Lastly, they reported that the creation of organizational knowledge is the ability of

an organization as a totality, to create new knowledge and to disseminate it inside the organization and to integrate it to products, services, and systems.

From the above mentioned it can be deduced that knowledge is considered a valuable intangible (initially and then tangible) resource, which can be decisive for the sustainability of the organizations. Drucker (1995) pointed out that knowledge is an important economic resource in an organization. KM was originated and used firstly in the private sector of the economy, however, in the last years its exploitation is considered essential for the public sector as well.

Knowledge Creation and Diffusion

In this study, two specific concepts of KM are evaluated through a questionnaire: knowledge creation and knowledge diffusion. These two concepts are presented theoretically in this section.

Firstly, knowledge creation refers to the continuous process of combination, transfer, and conversion of different kinds of knowledge and these processes occur as people interact, practice and learn inside an organization.

On the other hand, knowledge diffusion is the scientific process of disseminating knowledge. It can be also stated that it is the process of knowledge transfer. Another concept that is used interchangeably with the above, is knowledge sharing. The three terms “knowledge diffusion”, “knowledge transfer” and “knowledge sharing” are often used with different meanings from scholars. In this study, it will be considered that these three terms have the same meaning and in general they refer to the formal and the scientific process that knowledge is communicated inside the same organization or between different organizations.

Factors Affecting Knowledge Transfer

Many factors affect the ability of an effective knowledge transfer process, within an organization. One of the most important factors that influence knowledge transfer in organizations is organizational culture (Davenport & Prusak, 1998; Goh, 2002; Guzman & Wilson, 2005; Suppiah & Sandhu, 2011; Syed-Ikhsan & Rowland, 2004; Szulanski, 2000). To encourage transfer, organizations must foster a culture of cooperation and collaboration (Goh, 2002), advice and support (Szulanski, 2000).

However, a culture of collaboration and cooperation is not sufficient to favor knowledge transfer and organizational learning: the organization must also encourage a culture of seeking and solving problems, where failures and errors related to experimentation are expected, tolerated and viewed as learning lessons by the employees and the organization (Edmondson, 2004; Goh, 2002). In this sense, management must serve as a role model by sharing its knowledge, identifying

problems to solve and admitting its mistakes (Goh, 2002; Halbesleben & Rathert, 2008; Pfeffer & Sutton, 1999).

All of these, related to the organizational culture factors, contribute to the infusion of a climate of trust, an essential condition for willingness to cooperate (Goh, 2002), particularly in the transfer of tacit knowledge (Davenport & Prusak, 1998). To create this climate of trust, management can also allot time to knowledge transfer (Davenport & Prusak, 1998) and help people to understand the purpose, value and content of knowledge transfer initiatives (Guzman & Wilson, 2005; Kalling, 2003).

Other factors that also influence knowledge transfer, may include:

- Characteristics of the knowledge source (motivation, reliability, absorptive capacity and disseminative capacity).
- The knowledge recipient (motivation, absorptive capacity and retentive capacity).
- The relationship between the recipient and the source are also important in determining the effectiveness of knowledge transfer (Parent, Roy, & St-Jacques, 2007; Szulanski, 2000).

The type of knowledge being transferred is another factor to consider. Explicit knowledge becomes easily accessible when it is codified or communicated (for instance, through information technologies), whereas tacit knowledge, found in mental models, abilities, beliefs and expertise that individuals have acquired over time, cannot be codified and is imparted mainly through social interaction (Davenport & Prusak, 1998; Goh, 2002; Nonaka, 1994).

KM and Human Resources

In order to achieve successful KM implementation, organizations need to determine the crew members responsible for it. Therefore, this section discusses the responsible members of the staff for KM implementation and how they are identified. Nonaka & Takeuchi (1995) are among the first to introduce the term “Knowledge Crew”. This concept refers to the staff members responsible for the identification, promotion and creation of knowledge within the organization. The knowledge crew consists of three key people in the organization: the knowledge officers (top management), the knowledge engineers (MMs), and the knowledge practitioners (front-line employees) (Al-Hakim & Hassan, 2011b).

According to Nonaka & Takeuchi (1995), knowledge creation generally starts from MMs who are considered the true “knowledge engineers” of creating new knowledge in the organization. They are responsible for synthesizing tacit knowledge of top management and front-line employees, and transfer it into explicit knowledge. They

are also able to create a spiral of knowledge across different functional areas in the organization structure. Accordingly, MMs play a central role in KM implementation (Richards, 2004). Situated at the interface between strategic management and front line management, MMs play a determining role in the success of the knowledge transfer process. Research on MMs underlines that they are more than simple intermediaries: they are also agents of change, facilitators of knowledge transfer, innovators, key strategic players and coaches to their employees (Conway & Monks, 2011; Floyd & Wooldridge, 2000; Huy, 2001; Nonaka, 1994; Rouleau, 2005; Valentino, 2004).

On the other hand, the MM concept is only possible (exists) in a type of organization in which positions have a margin of managerial work and operational work, where the proportion of managerial work increases with increasing responsibility within the operation of the organization: “knowledge workers expect to make the decisions pertaining to their own field” (Drucker & Merino, 2000). From this consideration, the MM becomes a key player with a high degree of responsibility derived from its strategic place within the organizational structure, since he knows both the day-to-day activity and the organization’s strategy (Nonaka, 1994). With this perspective it might appear that middle management is just a vertical mediator between management and operational levels; but this view must be complemented by identifying middle management also as a horizontal integrator that ensures the distribution of knowledge throughout the organization (Costanzo & Tzoumpa, 2008; Kraut, Pedigo, McKenna, & Dunnette, 2005).

In recent years, several studies have been conducted to measure the effective role of MMs in creating various new knowledge perspectives. All of these studies have agreed that the role of MMs has shifted from just being a link between top management and operational supervisors to a new role that seeks to create knowledge and utilize knowledge through the provision of innovative work, which is reflected in the operational planning (Wong & Aspinwall, 2005; Gunther-McGrath, 2001; Huy, 2001).

Janczak (2004) explored the dynamics and new roles of MMs in the creation and integration of knowledge. The author noted that the MMs used three behavioral roles, which are analytical, intuitive and pragmatic, which are integrated with knowledge modes to create new knowledge.

Based on the above, the modern role of MMs has become a source of knowledge and they are considered leaders of knowledge workers (Richards, 2004; Nonaka & Takeuchi, 1995). From the above mentioned it can be deduced that MMs’ role in the circulation of knowledge and information is very important inside an organization.

However, the most influential work about MM’s roles in modern organizations has been presented by Floyd & Wooldridge (1996; 1997; 2000). Their main point was that MMs’ centrality in the information network provides them the opportunity

to become a driving force in a KM context (Psychogios et al., 2008). The model presented in this study, is part of the work of Floyd & Wooldridge.

MAIN FOCUS OF THE CHAPTER

Issues

In this study, the connection of MMs with KM practices in modern organizations, is presented. It is understood that MMs' role in KM creation and diffusion is very important. Hence, a model that attempts to evaluate this role was found and presented. Finally, there was an effort to check if the chosen theoretical model for MMs roles in KM, was validated in the empirical sample utilized.

Theoretical Model and Sample

Theoretical Model

The theoretical model (Floyd & Wooldridge, 1996) implemented in this study, includes four basic roles (synthesizing, implementing, facilitating, championing), expressing the KM actions of a middle administrative executive as a result of its influence in the current (existing) strategy. These four roles were analyzed in twenty criteria that a manager could act and behave.

More specifically, it is evident that roles of middle management deal mostly with change: comprehending the need for change (synthesizing role), preparation for change (facilitating role), inciting change (championing-supportive role), and finally managing the whole process (implementing role). A more analytical presentation of the roles follows:

1. **Championing:** Championship of alternative strategic solutions.
 - Championing role includes middle managers' actions to promote strategic initiatives to superior level, while during this process they differentiate the repertoire of organization abilities.
2. **Synthesizing Role:** Information synthesis.
 - Synthesis is the conception of the process' peak, which elevates innovation and expands the range of strategic capabilities.
3. **Facilitating Role:** Facilitating adaptability.
 - In this role middle managers create the appropriate learning conditions in their subgroup.
4. **Implementing Role:** Execution of planned strategy.

The Role of Middle Managers in Knowledge Creation and Diffusion

- Their most recognized role is the implementation of top management's intentions. Here the strategic contribution is based on the efforts of middle manager to extend existing resources effectively and efficiently.

Table 1 (in the Appendix) presents all the items/questions of the questionnaire.

Sample

With a purpose to explore the objective of the study, a quantitative survey was conducted. A random sample of one thousand MMs was drawn from different data sources in Greece. The aim was to include MMs working in various organizations. Finally, the responses collected were from two hundred and forty-one middle managers of forty-three Greek organizations. The organizations participated in the survey, were from the private and public sector, of different sizes, and of different sectors of the economy. MMs of these organizations evaluated the statements included in the questionnaire, in a five-point Likert scale.

SOLUTIONS AND RECOMMENDATIONS

First of all, the reliability of the data and the responses collected with the specific questionnaire was tested. According to the reliability analysis expressed by Cronbach's Alpha index, the value of the index was 0.918, which is very satisfactory. During the analysis of the data collected, statistical methods were implemented as: assessing normality, Cronbach's Alpha, descriptive statistics, t-test, anova, correlations and partial correlation, factor analysis, structural equation modeling. However, in this paper, only methods and results concerning the main objective are presented.

In our case, the theoretical model of the basic roles of a MM, was validated through the factor analysis executed. Moreover, in order to further verify the outcomes from factor analysis, Amos software (which is used to fit structural equation models) was utilized. This software with the contribution of mathematical models can present specific indices, which can evaluate if the resultant model fits (or not) with our data. Hence, as resulted, all latent variables (the four factors of factor analysis) with their criteria were also validated, as in the factor analysis process. This check was realized for every factor separately and for all these factors together. In order to diagnose if each controlled model latent variable and its criteria were fitted to the collected data, the probability of adjustment in chi-square test and three indices (TLI, CFI, and RMSEA) were utilized. It was observed that in all four basic factors, which originated from the factor analysis, the values of the indices were in the acceptable

intervals, and hence it was accepted that each factor presents a good fit and that the model created is considered reliable.

Eventually, as aforementioned, the model of the roles of MMs in KM practices and processes, examined with the specific questionnaire, seemed to be validated.

FUTURE RESEARCH DIRECTIONS

The model of MMs' role, using the questionnaire of this research, could be investigated in other countries, in order to find whether the model is validated.

More detailed analysis of the responses is required, in order to evaluate the level of the implementation of the model's roles from Greek MMs. For example, Al-Hakim & Hassan (2011a) in their study, have revealed the importance of the MMs role in KM implementation and the conceptual framework used, had explained the direct relationship between MMs role (consist of analyst, intuitive and pragmatic) and core requirements of KM implementation (CSFs of KM, KM strategies and KM processes).

In another empirical research (Gaál, Szabó, Obermayer-Kovács & Csepregi, 2012), conducted among Hungarian medium- and large-sized enterprises, the findings indicated that four principal components can be considered by MMs during knowledge sharing and they relate to the availability and usefulness of knowledge. Hence, it is realized that MMs (conducting their interconnections) must be available and must transfer useful knowledge in order to contribute successfully to knowledge transfer process.

In general, it can be said, that the future is wide open for further empirical research in this area. The role of MMs in KM practices is a crucial subject for all the organizations.

CONCLUSION

The implication of MM's in the management of knowledge is a demanding and very complex responsibility, but essential for every organization which aims at maintaining itcompetitiveness in a continuous changing modern environment. The main scope of this research was the validation in practice from the empirical data collected, of an integrated theoretical model which assesses KM status of a middle administrative executive. The theoretical model included four basic roles that express the KM actions and practices used by MMs as an outcome of its influence in the organization's strategy.

The empirical implementation of the model with the realization of a primary research in a sample of two hundred and forty-one MMs, of forty three Greek organizations, had as a main scope to check the validation of the theoretical model in practice.

The general conclusion is that the theoretical model of the basic roles of MMs in KM was validated. Factor analysis concluded that the observed loading for every resultant factor (role of MM) is realized exactly from the criteria (item of the questionnaire), which the theoretical model predicted.

REFERENCES

- Akhavan, P., Jafari, M., & Fathian, M. (2006). Critical success factors of knowledge management systems: A multi-case analysis. *European Business Review*, 18(2), 97–113. doi:10.1108/09555340610651820
- Al-Hakim, L.A. Y., & Hassan, S. (2011a). The Role of Middle Managers in Knowledge Management Implementation for Innovation Enhancement. *International Journal of Innovation, Management and Technology*, 2(1).
- Al-Hakim, L.A. Y., & Hassan, S. (2011b). The role of middle managers in knowledge management implementation to improve organizational performance in the Iraqi mobile telecommunication sector. *Interdisciplinary Journal of Contemporary Research in Business*, 3(5), 948–965.
- Bower, J. L. (1986). *Managing the Resource Allocation Process*. Boston: Harvard Business School.
- Carty, R., & Walsh, S. (2007). The role of middle managers in knowledge transfer. *Journal of Information and Knowledge Management*, 6(4), 297–302. doi:10.1142/S021964920700186X
- Chandler, A. D. (1977). *The Visible Hand: The Managerial Revolution in American Business*. Cambridge: Harvard University Press.
- Choi, B., Poon, S. K., & Davis, J. G. (2008). Effects of knowledge management strategy on organizational performance: A complementarity theory-based approach. *Omega*, 36(2), 235–251. doi:10.1016/j.omega.2006.06.007
- Conway, E., & Monks, K. (2011). Change from below: The role of middle managers in mediating paradoxical change. *Human Resource Management Journal*, 21(2), 190–203. doi:10.1111/j.1748-8583.2010.00135.x

- Costanzo, L. A., & Tzoumpa, V. (2008). Enhancing organizational learning in teams: Has the middle manager got a role? *Team Performance Management*, 14(3/4), 146–164. doi:10.1108/13527590810883424
- Davenport, T. H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Boston, MA: Harvard Business School Press.
- Delmestri, G., & Walgenbach, P. (2005). Mastering techniques or brokering knowledge? Middle managers in Germany, Great Britain and Italy. *Organization Studies*, 26(2), 197–220. doi:10.1177/0170840605049464
- Drucker, P. (1993). *Post-capitalist society*. Oxford: Butterworth Heinemann.
- Drucker, P. (1995). *Managing in a time of Great Change, Truman Talley/E.P.* New York, NY: Dutton.
- Drucker, P. F., & Merino, M. I. (2000). *El Management del Siglo XXI*. Barcelona: Edhasa.
- Edmondson, A. C. (2004). Learning from failure in health care: Frequent opportunities, pervasive barriers. *Quality & Safety in Health Care*, 13(Suppl. II), ii3–ii9. doi:10.1136/qshc.2003.009597 PMID:15576689
- Floyd, S. W., & Wooldridge, B. (1996). *The Strategic Middle Manager: How to create and sustain competitive advantage*. San Francisco, California: Jossey-Bass publishers.
- Floyd, S. W., & Wooldridge, B. (1997). Middle managements strategic influence and organizational performance. *Journal of Management Studies*, 34(3), 465–485. doi:10.1111/1467-6486.00059
- Floyd, S. W., & Wooldridge, B. (2000). *Building strategy from the middle: Reconceptualizing strategy process*. Thousand Oaks, CA: Sage.
- Gaál, Z, Szabó, L, & Obermayer-Kovács, N., & Csepregi, A. (2012). Middle Managers' Maturity of Knowledge Sharing: Investigation of Middle Managers Working at Medium- and Large-sized Enterprises. *Electronic Journal of Knowledge Management*, 10(1), 26–38.
- Geisler, E. (2008). *Knowledge and knowledge systems*. Hershey, PA: IGI Publishing. doi:10.4018/978-1-59904-918-2
- Goh, S. C. (2002). Managing effective knowledge transfer: An integrative framework and some practice implications. *Journal of Knowledge Management*, 6(1), 23–30. doi:10.1108/13673270210417664

The Role of Middle Managers in Knowledge Creation and Diffusion

- Gunther-McGrath, R. (2001). Exploratory learning, innovative capacity and managerial oversight. *Academy of Management Journal*, 44(1), 118–131.
- Guzman, G. A. C., & Wilson, J. (2005). The ‘soft’ dimension of organizational knowledge transfer. *Journal of Knowledge Management*, 9(2), 59–74. doi:10.1108/13673270510590227
- Halbesleben, J. R. B., & Rathert, C. (2008). The role of continuous quality improvement and psychological safety in predicting work-arounds. *Health Care Management Review*, 33(2), 134–144. doi:10.1097/01.HMR.0000304505.04932.62 PMID:18360164
- Ho, L. A. (2008). What affects organizational performance? The linking of learning and knowledge management. *Industrial Management & Data Systems*, 108(9), 1234–1254. doi:10.1108/02635570810914919
- Huy, Q. N. (2001). In praise of middle managers. *Harvard Business Review*, 79(8), 73–79. PMID:11550632
- Ireland, R. (1992). Corporate Culture is Best Conveyed by Mid-level Managers. *Baylor Business Review*, 10(1), 18–19.
- Janczak, S. (2004). How middle managers integrate knowledge within projects. *Knowledge and Process Management*, 11(3), 210–224. doi:10.1002/kpm.207
- Kalling, T. (2003). Organization-internal transfer of knowledge and the role of motivation: A qualitative case study. *Knowledge and Process Management*, 10(2), 115–126. doi:10.1002/kpm.170
- Kianto, A., Ritala, P., Spender, J.-C., & Vanhala, M. (2014). The interaction of intellectual capital assets and knowledge management practices in organizational value creation. *Journal of Intellectual Capital*, 15(3), 362–375. doi:10.1108/JIC-05-2014-0059
- Kim, H., & Gong, Y. (2009). The roles of tacit knowledge and OCB in the relationship between group-based pay and firm performance. *Human Resource Management Journal*, 19(2), 120–139. doi:10.1111/j.1748-8583.2009.00093.x
- Kraut, I., Pedigo, P. R., McKenna, D. D., & Dunnette, M. D. (2005, November). The role of the manager: What’s really important in different management jobs. *The Academy of Management Executive*, 19(4), 122–129. doi:10.5465/ame.2005.19417914
- Leydesdorff, L. (2003). The mutual information of university-industry-government relations: An indicator of the Triple Helix dynamics. *Scientometrics*, 58(2), 445–467. doi:10.1023/A:1026253130577

- Mokyr, J. (2002). *The gifts of Athena: historical origins of the knowledge economy*. Princeton, NJ: Princeton University Press.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14–37. doi:10.1287/orsc.5.1.14
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.
- Parent, R., Roy, M., & St-Jacques, D. (2007). A systems-based dynamic knowledge transfer capacity model. *Journal of Knowledge Management*, 11(6), 81–93. doi:10.1108/13673270710832181
- Pfeffer, J., & Sutton, R. I. (1999). Knowing ‘what’ to do is not enough: Turning knowledge into action. *California Management Review*, 42(1), 83–108. doi:10.2307/41166020
- Psychogios, A. G., Alexandris, K., & Onofrei, A. (2008). Addressing individual and organisational factors influencing middle managers’ synthesising role in knowledge creation and diffusion. *Int. Journal of Learning and Intellectual Capital*, 5(2), 208–222. doi:10.1504/IJLIC.2008.020152
- Richards, G. S. (2004). *A multi-level examination of the role of middle management in developing absorptive capacity: towards a theory of knowledge utilization in organizations* (Unpublished doctoral dissertation). Carleton University, Canada.
- Rouleau, L. (2005). Micro-practices of strategic sensemaking and sensegiving: How middle managers interpret and sell change every day. *Journal of Management Studies*, 42(7), 1413–1441. doi:10.1111/j.1467-6486.2005.00549.x
- Schlesinger, L. A., & Oshry, B. (1984). Quality of Work Life and the Manager: Muddle in the Middle. *Organizational Dynamics*, 13(1), 5–19. doi:10.1016/0090-2616(84)90028-7
- Staehle, W., & Schirmer, F. (1992). Lower-level and Middle-level Managers as the Recipients and Actors of Human Resource Management. *International Studies of Management & Organization*, 22(1), 67–89. doi:10.1080/00208825.1992.11656576
- Suppiah, V., & Sandhu, M. S. (2011). Organisational culture’s influence on tacit knowledge-sharing behavior. *Journal of Knowledge Management*, 15(3), 462–477. doi:10.1108/13673271111137439

The Role of Middle Managers in Knowledge Creation and Diffusion

Syed-Ikhsan, S. O. S., & Rowland, F. (2004). Knowledge management in a public organization: A study on the relationship between organizational elements and the performance of knowledge transfer. *Journal of Knowledge Management*, 8(2), 95–111. doi:10.1108/13673270410529145

Szulanski, G. (2000). The process of knowledge transfer: A diachronic analysis of stickiness. *Organizational Behavior and Human Decision Processes*, 82(1), 9–27. doi:10.1006/obhd.2000.2884

Uyterhoeven, H. (1989). General Managers in the Middle. *Harvard Business Review*, 67(5), 136–145. PMID:10295475

Valentino, C. L. (2004). The role of middle managers in the transmission and integration of organizational culture. *Journal of Healthcare Management*, 49(6), 393–404. doi:10.1097/00115514-200411000-00009 PMID:15603115

Wong, K. Y., & Aspinwall, E. (2005). An empirical study of the important factors for knowledge-management adoption in the SME sector. *Journal of Knowledge Management*, 9(3), 64–82. doi:10.1108/13673270510602773

Yang, B., Zheng, W., & Viere, C. (2009). Holistic Views of Knowledge Management Models. *Advances in Developing Human Resources*, 11(3), 273–289. doi:10.1177/1523422309338584

Yang, D. (2011). The effect of knowledge management on product innovation: Evidence from the Chinese software outsourcing vendors. *IBusiness*, 3(1), 16–22. doi:10.4236/ib.2011.31003

Zhang, A. Y., Tsui, A. S., Song, L. J., Li, C., & Jia, L. (2008). How do I trust thee? The employee-organization relationship, supervisory support, and middle manager trust in the organization. *Human Resource Management*, 47(1), 111–132. doi:10.1002/hrm.20200

ADDITIONAL READING

Floyd, S. W., & Wooldridge, B. (1992). Middle management involvement in strategy and its association with strategic type: A research note. *Strategic Management Journal*, 13(1), 178–195. doi:10.1002/mj.4250131012

Lelic, S. (2001). Creating a knowledge sharing culture. *Knowledge Management*, 4(5), 6–9.

- Pappas, J. M., & Wooldridge, B. (2007). Middle managers' divergent strategic activity: An investigation of multiple measures of network centrality. *Journal of Management Studies*, 44(3), 323–341. doi:10.1111/j.1467-6486.2007.00681.x
- Ponelis, S., & Fairer Wessels, F. A. (1998). Knowledge management: A literature review. *South African Library and Information Science*, 66(1), 1–10.
- Psychogios, G. A., & Wilkinson, A. (2007). Exploring TQM awareness in the Greek national business context: Between conservatism and reformism cultural determinants of TQM. *International Journal of Human Resource Management*, 18(6), 1042–1062. doi:10.1080/09585190701321666
- Vouzas, F., Burgoyne, J., & Livian, Y. F. (1997). Trends in European middle management: evidence from five countries. In Y. F. Livian & J. Burgoyne (Eds.), *Middle Managers in Europe*. London: Routledge.
- Vouzas, F., & Psychogios, A. (2007). 'Assessing managers' awareness of TQM'. *The TQM Magazine*, 19(1), 62–75. doi:10.1108/09544780710720844
- Wooldridge, B., Schmid, T., & Floyd, S. W. (2008). The middle management perspective on strategy process: Contributions, synthesis, and future research. *Journal of Management*, 34(6), 1190–1221. doi:10.1177/0149206308324326

KEY TERMS AND DEFINITIONS

Explicit Knowledge: An organized set of information (knowledge) that have the potential to be identified, seized, codified, stored and shared.

KM Practices: Specific methods or initiatives used by the organization to support the creation, transfer, storage, retrieval and application of knowledge, and they can include technical as well as human components. Learn more in: Knowledge Management Strategies Implementation in Innovation Intensive Firms.

KM Processes: Actions concerning creating, sharing and applying knowledge in order to gain market opportunity and improve organizational performance (Yang, 2011).

Knowledge: Set of information including experiences, values, context information about specific fields of action in an organization, used to evaluate and incorporate new experiences and information.

Knowledge Creation: The formation of new notions and concepts realized by interactions between explicit and tacit knowledge in people's minds.

Knowledge Diffusion: The scientific process of disseminating knowledge.

The Role of Middle Managers in Knowledge Creation and Diffusion

Knowledge Management: The process of identifying, creating, sharing, using and managing the knowledge and information inside an organization in order to achieve the company's objectives.

Strategic KM: The strategic planning, implementation, and updating activities related to the knowledge-based assets in the firm (Kianto, Ritala, Spender, & Vanhala, 2014).

Tacit Knowledge: Experience- and intuition-based internalized knowledge that is held by every individual and that can be difficult to explicate in a formal way.

APPENDIX

Table 1. Items of the questionnaire

Number	Individual Items
E1	Monitor and assess the impact of changes in the organization's external environment
E2	Implement action plans designed to meet top management objectives
E3	Integrate information from a variety of sources to communicate its strategic significance
E4	Evaluate the merits of new proposals
E5	Evaluate the merits of proposals generated in my unit
E6	Translate organizational goals into objectives for individuals
E7	Encourage the implementation of change/experimental programs
E8	Assess and communicate the business-level implications of new information to him
E9	Search for new opportunities and bring them to the attention of higher-level man
E10	Communicate and sell top-management initiatives to subordinates
E11	Define and justify the role of new programs or processes in upper-level management
E12	Encourage multidisciplinary problem-solving teams
E13	Proactively seek information about my business from customers/citizens, supplier
E14	Monitor and communicate with higher-level managers the activities of competitors,
E15	Justify to higher-level managers programs that have already been established
E16	Provide resources and develop strategies for unofficial projects
E17	Translate organizational goals into departmental action plans
E18	Relax regulations and procedures in order to get a new project started
E19	Propose new programs to higher-level managers
E20	Monitor activities within your unit to ensure that they support top-management objectives

Source: (Floyd & Wooldridge, 1996)

Notes: the above items belong to the following roles respectively:

Championing Role: E4, E9, E11, E15, E19

Facilitating Role: E5, E7, E12, E16, E18


Synthesizing Role: E1, E3, E8, E13, E14


Implementing Role: E2, E6, E10, E17, E20

Chapter 6

Using Action Research for Improvement of Project Knowledge Management in the Public Museum

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ABSTRACT

This chapter aims at presenting the results of the research carried out as part of the action research project concerning knowledge management and knowledge sharing in a public institution. As a research subject, a public cultural institution in Poland was selected. The methods used during the implementation of the research include observations, interviews, questionnaire surveys, and document analysis. The chapter presents the course of the research process, a diagnosis of problems, and challenges of the institution under study as regards project knowledge management, analysis of results, and recommendations. The principal result of the study is the

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developed action plan that contains an overview description of the proposed change and suggestions for solutions for the diagnosed challenge. It also illustrated that action research is a research approach supporting project management processes in public organizations. The theoretical background for considerations undertaken in the work are the concepts of project knowledge management and sharing knowledge on the implemented projects.

INTRODUCTION

The problematic aspects of knowledge management have nowadays been the subject of widespread interest. It does not only apply to large companies, but also to small and medium-sized enterprises, which notice that appropriate actions serving the dissemination and using of knowledge can bring many benefits to the organisation (Birkinshaw, 2001). Recognising the positive impact of knowledge management in private organisations, also makes public sector organisations implement solutions in this area. The need to redefine and improve the methods of managing public organisations is associated with a different perception of their place and role in the society than the one existing so far. Changes taking place in the public sector cause that knowledge here is also treated as the organisation's strategic resource (Girard, 2018).

In addition to knowledge management, project management is becoming an extremely important trend in contemporary public organisations. Increasingly, they become a method to achieve the organisation's strategic goals. Appropriate management of project knowledge can thus significantly impact the success of organisations implementing an increasing number of projects (Wirick, 2009). The popularisation of projects in the public sector is attributable to the 1990s (Kerzner, 2017). This was associated with not only changes taking place at organisation level, but also of entire countries, caused by the implementation of new management methods, based on New Public Management (NPM) principles (Osborne, Radnor, & Nasi, 2012). NPM, assuming modernisation and marketisation of the public sector, was a response to a certain disappointment with public administration, in the case of which more and more the following was shown: incompetence in performing public tasks, methods of action not adapted to the changing environment, inefficiency, or excessive bureaucracy and mismanagement (Abbasi & Al-Mharmah, 2000). Project management seems to fulfil some of NPM's postulates - introducing greater flexibility, a task-oriented approach, and efficiency of public institutions' actions (Rosta, 2011).

Despite the fact that projects are becoming a more and more popular management method, also in public museums, one of the most important public organisations in each country, still not much is known about the processes of project management. There is a research gap - no research on knowledge management that is generated in project work in the museums. Taking into account the importance of these organisations, their importance for the development of societies, undertaking research on understanding the processes of gathering and sharing explicit and tacit knowledge in public museum projects is scholarly relevant. Therefore, this chapter's objective is to address and explore the problem of project knowledge management in a large public museum. Specifically, as it is based on Action Research approach, it asks the research question: How can the process of project knowledge sharing in Museum of Kraków be improved?

As a research method, a single case study was selected, the subject of which is The Museum of Kraków - one of the largest municipal museums in Poland. The museum is the largest museum of the City of Krakow. Krakow is located in the southern part of Poland in the Lesser Poland region and is the country's former capital, a city inscribed on UNESCO's World Heritage List. The museum was founded in 1899 and initially functioned as part of the municipal archives, and since 1945 as an independent institution. Its collection of over 170,000 artefacts includes items related to the history of Krakow and its self-governance; the most famous collections include Krakow's nativity scenes or Christmas Cribs and photographs of old Krakow (from the turn of the 19th and 20th centuries). The museum is the guardian of local traditions, and Krakow's nativity scene making is inscribed (as the first from Poland) on UNESCO's Representative List of the Intangible Cultural Heritage of Humanity. It has 19 branches located in various parts of the city, where permanent and temporary exhibitions on selected issues from over 1,000 years of Krakow's history are presented. Every year it is visited by 1.3 million visitors from the home and abroad. The museum organises a few dozens of projects annually, including scientific (concerning Krakow's history), temporary exhibitions and educational events. In addition, it implements investment projects regarding international cooperation (international conferences and exhibitions).

It is a member of international organisations. Around 30% of the 338 employees are involved in projects implemented by the Museum.

An important element of managing The Museum of Krakow is project management. In the years 2011-2012, a project management system, based on the PMI methodology, was implemented at the Museum. Project document templates were developed - a project card with attachments (schedule, cost estimate, scenario, promotion plan, communication plan, periodical and final reports) and an intra-organisational information flow system - between employees and the management and between organisational units involved in their implementation. The next step

was to train employees in the basics of project management and the project-related procedures in force at the Museum.

The structure identifies two organisational units that are crucial for the project management process - they are: Department of Production of Exhibitions and Museum Events, bringing together experienced project managers, as well as a Support Management Process Section that performs monitoring functions related to the implemented projects. In the context of the topic of project knowledge management discussed in the article, it should be highlighted that the Section is a place that collects and provides information and project-related materials. In accordance with the adopted rules set out in the Museum's internal procedures, temporary exhibition projects are performed in a three-year cycle, and educational and popularising events in a two-year cycle. These two types are dominant when it comes to the specifics of projects implemented at the Museum. Moreover, the Museum carries out investment projects, for example associated with the creation of new branches or renovation of existing ones, which is sometimes associated with the creation of permanent exhibitions. Considering the different areas of the Museum's activity and the scale of program-related activity (a large number of branches) carried out simultaneously, several dozen projects are implemented at various stages.

Over the following years of its activity and the implementation of many projects, the Museum conducted and carried out activities in order to improve the project management system, but no attention was paid to the issue of managing project knowledge. Evaluation of exhibition projects is being carried out; the employees have access to project documentation via the internal intranet. However, only the study carried out using the action research method, presented in this article, allowed for an in-depth familiarization with the organisation's current situation in this area and undertaking actions in accordance with the action plan, which will be discussed later.

METHODOLOGICAL APPROACH

The empirical material on the basis of which this chapter was collected as a result of the action research carried out in the years 2018/2019.

When discovering the roots of the action research, it is necessary to get acquainted with the views of Kurt Lewin, recognised as the creator of this approach. In his methodological assumptions, Lewin emphasised designing an experiment carried out in the natural environment for a given phenomenon or group of people in order to test his hypotheses. This action was to enrich the knowledge of researchers about the process, however, it caused difficulties in interpretation, so it required from the person conducting the study to embed the analysed problem in theoretical knowledge, decoding the message and interpretation (MacDonald, 2012). The increase in the

popularity of this approach to conducting research has become a reflex for many areas of management, leading to the popularisation of the practical paradigm (Phillips, Berg, Rodriguez & Damion, 2010).

Action research is a process in which the nature of research and practical activity is cyclical. It consists of the following stages:

- Diagnosing the problem or challenges, gaining knowledge about it.
- Taking action in cooperation with the group interested in problem solving.
- Critically assessing the results of research, as well as their interpretation and drawing conclusions.
- Data collection on results and analysis of the effectiveness of the changes introduced (Coghlan & Brannick, 2005).

What is important is that the cycle is repeated by improving or adding new information and conclusions until an optimal solution is created (Gill & Johnson, 2010).

The decision to implement the study using the action research approach resulted from the possibility of using a pragmatic paradigm, the possibility of using theoretical pluralism and the ability to generate knowledge significant from the point of view of the organisation studied.

In the original assumptions, the study was described as participatory action research since the approach is based on the participation of people from the studied organisation in the implementation of the study, who are also treated as researchers. While defining the research problem they have a final say, they also control the course of the research and discuss the practical solutions of the analysed matter with the participation of the researcher.

Democratization of the research process and involvement in the dialogue and cooperation of all parties in the process, enables the researchers and the studied community to learn from themselves, the transfer of knowledge and experiences (MacDonald, 2012).

Finally, all the distinctive elements of the participatory action research, such as the involvement of the whole community, were not implemented, thus the research carried out had some features of this approach.

The purpose of the conducted action research was introducing organisational change, streamlining the process of managing project knowledge in the organisation under study. In the course of the process, qualitative data were obtained from the research carried out in the form of observations and interviews as well as the analysis of internal procedures, documents and legal acts, and quantitative- collected by means of a survey questionnaire. In the organisational context, the conducted action research

served to identify ways of sharing knowledge on project management, analysing these methods, and considering the need for the organisation to improve this field.

KNOWLEDGE MANAGEMENT

Contemporary public organisations face the requirement of adapting to changing environmental conditions. The success of this challenge largely depends on effective knowledge management. This is particularly important because not only on the economy but also social life depends on this resource (North & Kumta, 2018).

Knowledge has become a resource with strategic importance, so it is important that it is collected, protected, and used in an effective manner. The aim of gathering knowledge is to make faster and better decisions thanks to the intellectual resources possessed, which affects the maintenance of a competitive advantage (Loebbecke, Fenema & Powell, 2016).

The fact that knowledge is of key importance for the organisation's management is determined by the amount of knowledge possessed, the rate of its growth, the process of globalisation and changes: in the internal environment- connected with social, communication, or technological innovations and changes taking place in an external environment - economic, legal, political, and social (Griffin, 2012). In order to effectively implement their activities, organisations are obliged to adapt to the changes taking place and undertake activities which enable transforming into knowledge-based organisations (Westerberg & Hjelte, 2014).

Knowledge management consists in using resources owned by the organisation. These resources are considered to be properly functioning solutions in the field of information systems management, organisational changes, and human resources (Davenport & Prusak, 2004). The components of the knowledge management system in business organisations and also those belonging to the public sector are: a strategy that includes intellectual capital as well as organisational efficiency and effectiveness as well as systems and technologies existing in the organisation (Mazur, 2013). An important element is also organisational learning, which includes the search for knowledge, the use of knowledge, and its dissemination (King, 2009).

The knowledge resources that organisations have most often are not collected systematically, they are often difficult to locate or find. There are many models that describe the knowledge management process. They occur mainly in knowledge-based organisations. The model proposed by Jashapara consists of five phases:

- **Knowledge Discovery:** Locating useful knowledge inside and outside the organisation, placing emphasis on organisational knowledge - cheaper but often more difficult to capture than the external one - resulting from the

analysis of the environment. This is due to the fact that it is often more difficult to make an objective assessment of one's own organisation.

- **Knowledge Generation:** The result of a hybrid of knowledge of employees and knowledge from the environment. The difficulty in perceiving the process results from the fact that knowledge arises in a way that is often uncontrolled, e.g. when employees get in touch with information.
- It is very important not to miss this moment and keep it in the form of reproducible results.
- **Knowledge Dissemination:** Employees sharing the knowledge they have gained through creative thinking, observation, or experience.
- **Knowledge Use:** Verification of the suitability of knowledge is made when it translates into results and solutions. Use also means adapting knowledge to the organisation's needs and simplifying it.
- **Necessary Knowledge Preservation:** The phase of verification of the usefulness of the knowledge acquired. If it meets the criterion of utilitarianism it is preserved. It is treated as the organisation's memory (Jashapara, 2011).

Observing the systematic increase in the importance of knowledge being an element of the development of the organisation, its employees, and the entire sector, institutions and enterprises have begun to notice that an important aspect is its interpretation by a human being, resulting from experience, learning, and individual predispositions.

In the literature, knowledge sharing is understood as a process connected with the transfer of knowledge among members of the organisation through the processes of accumulating knowledge arising as a result of work. The difference between the information remaining in the human mind and knowledge sharing, or the type of interaction whose purpose is its manifestation, is emphasised. Many definitions place emphasis on the support of the work process and interactions supported by the use of technology (Saufi & Rosmaini, 2010).

In light of the above definitions, it is assumed that knowledge sharing is the mutual transfer of knowledge by people in the process of communication and collaboration. Owing to the transfer of knowledge, skills, and experience of individuals, information in the company can become useful for all of the organisation's members.

The way in which an organisation influences employee to encourage them to share knowledge depends on what kind of knowledge employees have at their disposal and on the type of organisation. Employees have both explicit and tacit knowledge at their disposal. Explicit knowledge is formal and publicly available information, presented by oral or written communication-documentation, instructions, diagrams, maps, symbols, or textbook or film editions. Its feature is the ease of transferring and registration as well as storage and dissemination (Toyama & Nonaka, 2015).

Tacit knowledge, on the other hand, is information and non-verbal experience, with a high degree of individualism. It has an intuitive dimension, it is acquired during its own, repetitive and long-term experiences of employees. The problematic issue is the lack of its verification because it is not registered or transmitted in any way difficult to formalize (Seidler-de Alwis & Hartmann, 2008)

It follows from the above considerations that storage and acquisition of tacit knowledge, so valuable for the organisation is a complicated process. It can be achieved by focusing on certain organisational activities such as: setting up mentoring mechanisms for less experienced employees, creating social and professional interactions between team members differing in their job seniority or age (Griffin, 2012). It is also important to implement systems that reward knowledge sharing and support counselling between employees. An important aspect is also space- it may be helpful to create a place where team members can meet to discuss activities, organise a meeting or hold semi-private conversations (Karaś & Piasecka-Głuszak, 2013). If specific knowledge is embedded in the mind of the participant, and if it is not made available to others through direct communication or registered in reports or other formal systems, then knowledge will probably not be available for future projects, and people will waste time inventing solutions that are already existing.

In the case of organisations operating in a project manner, like the Museum under study, knowledge management is particularly important. The resources of experiences are increased with each completed project. Therefore, the impact of communication on the project is invaluable, as it is one of the most important elements of a well-managed project. There are two basic groups in relation to which the project manager is obliged to develop a strategy for clear and effective communication - the project team and stakeholders (Rajkumar, 2010). For the project cooperation to be effective, the communication between involved stakeholders should be regular, complete and the information provided should be authenticated and updated. When creating a communication plan it is also necessary to define what kind of information is needed for a given group and what communication channel will be the most appropriate and facilitate the communication process (Schwalbe, 2015). The communication style chosen by the project manager (Kerzner, 2017) also has a significant influence on how the communication will be carried out in the project team. Therefore the communication method and the project communication plan, adopted in the organisation, can contribute to good cooperation, and thus success, generation of project knowledge and organisation growth. It can also cause knowledge to be hidden by employees and create an atmosphere of uncertainty (Rajkumar, 2010).

Sharing knowledge on project management takes place in a formal and informal way, as indicated in Table 1.

The formal and informal approach to sharing knowledge between projects is also influenced by the organisational structure. Moreover, when analysing factors

Table 1. Formal and informal methods of knowledge sharing

Formal knowledge Sharing	Informal Knowledge Sharing	Formalised Dependent on the Situation
Memos	Chat	Bulletin / newsletter
Reports	Discussion during break	Mentoring
Document management systems	Private meetings	Intranet/ Internet
Business talk	Work in a task team	Telephone conversation
Project team meeting	Informal personal contacts	Electronic correspondence
Formal personal contacts		Training / conferences

Source: (Jashapara, 2011), (Ekambaram& Jałocha, 2018), (Klincewicz, 2004)

influencing the effectiveness of knowledge sharing, the following should be taken into account: human/individual (e.g. attitude of co-workers towards the idea of knowledge sharing) and organisational (e.g. creating opportunities for knowledge sharing). What methods and tools will be used by the project team is influenced by the size of the team, whether the team meets regularly or what applications in the communication process have modern technologies that enable the process of knowledge sharing (Nemati-Anaraki, 2015). The ways and methods of knowledge sharing in organizations include, first of all, all activities that help to improve communication within project teams and provide employees with continuous knowledge transfer. Proven methods of knowledge sharing include regular meetings of not only team members, but also close cooperation of project managers, which allows for familiarization with applied solutions, creation and imitation of good practices, as well as mentoring during project work. The practice is to appoint employees whose task is to gain specific knowledge and then disseminate it within the organization. It is also invaluable to create repositories of knowledge in written form, which employees can use at any time (Madge, 2012).

David Wirick distinguishes between the types of strategies for obtaining explicit and tacit knowledge about projects in public organisations. In order to be able to capture and re-use public knowledge, project managers in the public sector should concentrate on creating a common electronic space in which documents can be shared and updated (Wirick, 2009). It is also good practice to develop project templates at such a level of generality, so that they could be reused. It is also important to prepare procedures and methodologies adapted to the conditions and needs of the institution and to document the conclusions drawn (Ekambaram& Jałocha, 2018).

Forms of gathering knowledge and managing it depend on the organisation's maturity, the scope of its operation and the way employees and managers approach it - whether they consider it important and valuable. Gathering knowledge through

the document management system – schedules, procedures, or memos is a popular way. They help in the reconstruction of certain elements occurring during work, they allow for getting to know the duration of individual stages or the resources used.

Knowledge can also be gathered through the use of decision-making process support systems in the organisation. They are created from the perspective of the end user, the analysis of the data contained in them allows to consider what may result from the decision associated with the method of work (Wyrozębski, 2019). The form of knowledge management is also increasing the level of knowledge in the field of managing public projects among people involved in such projects. It can take place through courses and training (Gasik, 2014).

Moreover, according to modern project management literature, there has been a long-standing belief that post-project reviews are beneficial to project knowledge management (Anbari, Carayannis & Voetsch, 2008). Cleland (1985, cited after Anbari, Carayannis & Voetsch, 2008) define post-project reviews as the assessment of the success and efficacy of the completed project, particularly to develop a profile of “lessons learned” that can help guide the management of projects in the future. Therefore, post project reviews that are opportunity to systematically improve performance in subsequent projects (von Zedtwitz, 2002), are crucial part of the project knowledge management systems in organizations.

The benefits of knowledge sharing and best practices in projects are invaluable. They limit or allow for eliminating the time devoted to inventing a concept of task implementation that was used in a given organisation in the past. They can also improve the organisation’s ability to learn (Pangil & Nasurddin, 2013). The knowledge generated by employees which they decide to share with others can be a unique resource of the organisation. Excessive and misguided reduction of human resources in the organisation can lead to the loss of valuable employees, along with whom the memory and a certain amount of knowledge are lost. This loss may be irreversible, which is why systematic knowledge management is so important (Griffin, 2012).

ACTION RESEARCH: PROCESS FLOW

Organisation Under Study

In order to improve practices in the field of project knowledge management in the public museum under study, in the period from March 2018 to March 2019 an action research was conducted. The research was carried out by two researchers. The first researcher was a student - a person from outside the organisation who was not associated with it in any way, while the second researcher was the Museum’s employee. The role of the researcher from outside the organisation was to identify

the issue being a challenge for the Museum, to engage the employees in the research and to design a solution to the analysed problem. The task of the researcher being an employee of the organisation was to create an opportunity for the researcher from outside the Museum to enter the organisation, make the data available, and support the process by facilitating contact with other employees. The research was conducted in order to write a Master's thesis, so the thesis' promoter was also engaged in the process, and who remained in touch with the studied organisation and coordinated the process.

Before starting to implement the research, the employees with whom the cooperation had been begun were informed about its purpose, and thanks to the support of the guardian in the organisation, they knew when and how they would be asked to participate in the study. The communication plan was agreed with the guardian on a regular basis, it was adapted to the specifics of duties at the Museum and, if necessary, modified in advance, as appropriate.

In the Museum under study, the way of implementing project-related tasks is based on the work of dispersed teams. This is due to the fact that the Museum has many branches located in different parts of the city. Employees working in the same project team often do not meet on a daily basis. During subsequent discussions regarding project management issues in the Museum, information was received that the level of knowledge about project management among employees was very diverse, not all communication tools were used and that a frequently occurring problem was the information flow on the status of individual projects. Based on these data, the documentation- event and exhibition cards, implemented in the form of projects were analysed again and interviews with the institution's employees were continued. It was considered that the organisation should develop certain mechanisms for sharing knowledge about project management, which would definitely facilitate the project team's work. After presenting the observations and conclusions to the researcher at the Museum, the problem in its current form was accepted. Subsequent talks, interviews, questionnaire, analysis of documentation and procedures showed that knowledge management about projects is really a challenge in the organisation.

Research Results

After completing the study, an analysis of the obtained information was made. The conducted interviews allowed to get to get familiar with the specifics of the operation of the project teams, the roles of individual people in these teams, and the ways of project implementation. Knowledge about opportunities and threats resulting from project work as well as strengths and weaknesses of the implementation of projects using them was acquired. Thanks to conversations with the employees, their opinions on the changes that were taking place in the organisation became known.

Information was also received from the interviewees on how they perceived knowledge sharing. However, discrepancies and different opinions were noticed regarding the key issues related to work in project teams and knowledge management. When all conversations had been held, it turned out, for example, that the employees had different information as to who was responsible for the organisation of training- the interlocutors pointed to different persons and departments. When asked whether training on project management had been taking place, the answers were very diverse- they were mutually exclusive in the scope of implementation or lack of training, participation in them, but also in the way they were implemented and the topics covered during the training. Interestingly, there were divergent statements made by people with similar seniority and institutions.

Another, very important issue from the point of the research carried out was the functioning in the organisation of a project management office, coordinating project work and supporting knowledge sharing processes. Some interlocutors claimed that there was a project management office in the organisation, while other interviewees gave names of departments that performed the office function- whereby these were different names of departments and sections. Answers were also received that there was no such office in the organisation, and one of the sections that the interviewees considered to be an office does not carry out in fact any such tasks and functions. This means that the employees do not have knowledge on this subject.

Upon receiving information on the regularity and frequency of meetings of the project teams, it turned out that such meetings are in fact organised, however, the regularity and frequency depend on the project manager. Nevertheless, during the interviews, information was also obtained that in the case of some teams there were no meetings of the entire team, but of sub-teams, and these were irregular meetings. There was also different information about the organisation of post-project meetings – most of the interviewees replied that such meetings had usually been organised. Some respondents answered that such meetings depended on the will of the project manager, while others said that such practice was unknown to them.

Asking the interviewees about whether the employees of the organisation share their knowledge with their colleagues, all responded affirmatively, specifying that it had usually been done in an informal way, but everyone had their own opinion as to what form of sharing knowledge was the best. Some people who developed their statements claimed that a good way to share knowledge would be to use project documentation if it was filled out in a reliable way.

The interviewees also drew attention to the need to take action in order to share knowledge, however, most of the time they gave reasons why such activities were difficult or even impossible in their opinion - the main obstacles included lack of time, lack of space for meetings, and lack of a person responsible for coordinating the actions.

The interviewees also declared that the idea of a mentor appearing in the organisation that would support the knowledge management processes and disseminate this knowledge was right, many employees shared their own reflection that every employee with such knowledge should be a mentor towards younger and less experienced employees.

The next stage of the research was the analysis of the questionnaire survey. It was an anonymous and one-off questionnaire. The questionnaire was composed of 12 questions, including open-ended questions, including a project-related question and closed-ended- conjunctive, disjunctive, and alternative questions. Two questions connected with statistical purposes were also asked. The aim of the survey was to examine selected factors influencing the process of knowledge sharing about project management in the organisation. 22 employees participated in the survey.

Based on the results of the questionnaire survey, the researchers learned that statistically each respondent implemented two project roles annually - in the majority of cases they had not been not recurring roles. This illustrates how important it is project knowledge management - it is important to have a person whose role in the project is changing and who has the opportunity to acquire knowledge that will help him or her effectively carry out his or her new duties.

All of the respondents deemed that sharing knowledge acquired during project implementation is an important element of the project team's work. For the most part, they justified it by avoiding making mistakes made in other projects, creating good practices, improving actions, and faster problem solving as well as the fact that many employees did not have project-related knowledge.

The respondents were also asked to identify which of the 19 methods and tools used to share knowledge about implemented projects are practiced in the organisation and selecting those that they thought were most useful. The most frequently practiced tools included: telephone conversation, electronic mail and reports, work in a task team and formal personal contacts as well as informal personal contact. Giving the answers as regards the utility of the tools, the respondents indicated meetings of the project teams, electronic mail, work in task teams and telephone conversation, formal personal contacts, and informal personal contacts.

What is interesting, some tools rated as useful are definitely less frequently used. This is the case for workshops, training, and document management systems.

The vast majority of employees claim that in order to perform their project tasks, they must independently search for knowledge necessary at this stage. Most of the respondents also believe that gathering project experiences allows maintaining the continuity of project knowledge in the organisation.

As far as the questions about post-project evaluation is concerned, the respondents believe that this is an important element of the work, and that it should take place as soon as possible. Asking the question about the truthfulness of these claims, only

one of the respondents questions them. In the case of the claim regarding the use of the experience of other people in project management, only three respondents disagreed with the statement. In the open question about whether and how the respondents transfer the knowledge acquired during the implementation of projects at the Museum, 21 persons declared that they communicated knowledge to other employees. Among the most frequently provided answers were the formal and informal conversations, project team meetings, evaluation meetings, and providing answers when someone came for help.

Analysing the results of interviews and the questionnaire survey, it is not possible to consider them in isolation from information obtained through observations and documents. Those employees who meet in project teams very rarely do not have a common vision of the processes taking place in the Museum, basing mainly on their own experiences or opinions they hear, are not always able to indicate what is really happening in the organisation. These differences are increased by the lack of regular post-project meetings or the changing trends at the Museum.

Conflicting information about the issue of employee training in project management appeared at all stages of the research. Some of the employees with similar job seniority claim that since the start of their work such training has not been organised in the Museum, while others declare that they took part in them. Most of the interlocutors and respondents is not able to indicate the department responsible for organising the training. The analysis of the documents shows that the HR Department is responsible for organising the training which most of the people contacted by me are not aware of. What is important, those employees who in the questionnaire declared that they would like to expand their knowledge about project management, training was the most attractive form in their opinion. Analysing the issue of the existence of a project management office, at all stages of the research, the employees were unable to answer the question whether such an office existed in their organisation.

It appears from the analysis of documents that in the case of investment projects, there is an investment section in the Museum's Technical Department. People who are involved in investment projects also have in their department an administrative element and a person who deals with project documentation. Support for other projects is the project monitoring section, which is responsible, among others, for communication and information flow between teams and the management, as well as collecting project documentation and sending project documentation in time. Although most of the employees with whom I was able to make contact recognised that was the section that implemented the tasks of the project management office, its employee explained to me that the section was set up for other tasks, and hence, did not carry out the functions and tasks of the project management office.

DISCUSSION

As the results of the conducted research show, the project knowledge generated by the organisation, which employees decide to share with others, is the organisation's unique resource.

Project team employees do not have a common understanding of project management and project knowledge. This is difficult to achieve when dealing with different project categories. In each one of them, project-related knowledge is different, specific, and connected with the team's responsibilities. There are, however, some common general principles that apply to each type of project. Propagating general knowledge about project management must take into account the above-mentioned 3 project portfolios or other endeavours such as, for example, organisational changes. General knowledge related to project management can be disseminated throughout the institution even on occasion of strategic processes and general development plans.

The study allowed to distinguish several areas in which knowledge sharing takes place in the organization. Explicit knowledge acquired during the implementation of the project is mostly gathered in the evaluation reports, however, these reports have some limitations - not every employee completes the documentation in a reliable way. To share explicit knowledge tools, such as the Limfo Lotus system, are also used. To gather project knowledge, project teams also use the Intranet and the internal platform "Our Affairs", which also include modules dedicated to ongoing projects. However, explicit knowledge gathered in these systems mostly contains some technical information and reports. However, the study has shown that there are invaluable layers of tacit knowledge in the organization too. Many Museum employees declare that there are people in the organization who are able to solve a given problem, and knowledge on this subject is usually released through informal conversations, but is not managed by the Museum.

In the organisation, knowledge about projects is dispersed, there is no knowledge base in which all information would be included. The existing solutions accumulate fragmentary knowledge and are dependent on the reliability of people who update knowledge. The knowledge acquired during the implementation of projects is mainly gathered in those people who acquire it through practice. The flow of knowledge through the organisation also needs to be improved.

There is an element of learning in the existing standards at the Museum, which is based on the fact that after the end of a temporary exhibition it should be evaluated. The conclusions drawn from the evaluation should be summarised with a report. The problem is, however, that the evaluation takes place 12 months after the exhibition is closed. This causes that it is difficult to reproduce the strengths and weaknesses important for the project, particularly in the situation when people implement several projects a year. It also prevents sharing knowledge about the success factors of a given

project. Another issue worth emphasising is the fact that the questionnaire shows that members of individual teams declare that evaluation is not organised after the project is finalised. According to some of my interlocutors, in other types of projects the practice of developing conclusions after the finalization of work has also been established, though post-project meetings are at the project manager's discretion.

Research has shown that an important element of project knowledge management is to create a separate space for registering project-related experiences. During the finalisation of individual projects, good practices are created, however in this area there is a need for creating universal rules, such as the need to update it in the course of the project and after its completion. It should also be described how this knowledge should be collected.

The regularity of team meetings is dependent on the type of project implemented, the needs resulting from the course of work, and the management style of the project manager. It is not always justified to organise a meeting of the entire team, often employees meet with the manager in sub-teams. However, there are teams where employees do not meet at all. In the organisation, there is no obligation to organise a project start-up meeting or a project summary meeting, which in some cases in fact does not take place. The lack of meetings causes the volatility of knowledge that arises during project implementation.

The results of the research also illustrate that the Management Process Support Section existing in the Museum does not carry out all the tasks expected by the employees. It does not assist knowledge management staff in a satisfactory manner and does not perform tasks related to gathering good post-project practices, which are a valuable method of knowledge sharing.

All the conclusions from the research are associated with a lack of awareness of the usefulness of project knowledge management that requires enhancing.

SOLUTIONS AND RECOMMENDATIONS

In response to the above problems, an action plan was designed that was created based on the assessment of current resources. It contains a description of the proposed solutions, defines the resources necessary to implement the change, a schedule of changes with success indicators, and an analysis of factors fostering and threatening the implementation of changes. The improvement project does not assume radical changes in the most part, but only a possibility of improving the already existing solutions. There are three key recommendations developed as a result of the action research project, as indicated in Table 2:

One of the recommendations is to further develop the Management Process Support Section, so that it is able to coordinate project knowledge management processes

Table 2. Key recommendations regarding improvement of project knowledge management in the Museum of Krakow

Identified Project Knowledge Management Problem in Organization	Proposed Solution	Theoretical Inspiration
The Management Process Support Section existing in the Museum does not perform tasks related to gathering good post-project practices.	To further develop The Management Process Support Section into a project management office o that it is able to coordinate project knowledge management processes within the organization.	Aubry, Müller, Hobbs, Blomquist (2010) Englund., Graham & Dinsmore (2003)
Lack of project knowledge management system in organization.	To develop principles of project knowledge management in the organisation through organising training in project management and creating a formal system for gathering good practices.	Anbari, Carayannis & Voetsch (2008) Kerzner (2017) Gasik (2011)
Employees do not share tacit knowledge.	To encourage employees to share tacit knowledge by supporting a project knowledge sharing culture in the organisation and undertaking activities for regular meetings of project teams with particular focus on meetings initiating and closing the project.	Seidler-de Alwis, & Hartmann (2008) Davenport & Prusak (2004)

within the organisation. The change would consist in extending the scope of the section’s competences, so that it implemented the definition-based functions of the project management office. The function of the Section would include managing project documentation, initiating changes in project monitoring, supervising work progress, developing project management in the organisation, and standardizing project management.

The section implementing the tasks of the project management office would also help in organising training in the area of project management, in creating a system of good project practices, or in constructing a system of sharing knowledge coming from projects already implemented.

Another recommendation consists in developing principles of project knowledge management in the organisation through organising training in project management, creating a system for gathering good practices, encouraging employees to share tacit knowledge, supporting a project knowledge sharing culture in the organisation and undertaking activities for regular meetings of project teams with particular focus on meetings initiating and closing the project . All the developed recommendations were discussed. An extremely important aspect of the research turned out to be the

fact that the recommendations were not created only by one external researcher, but after their preliminary description, a dialogue was started with the researcher – an employee of the Museum. The dialogism of this process allowed for the development of optimal solutions.

The proposed solutions included in the implementation plan are the result of a literature review and the experiences of other organisations. In order for the described changes to be implemented, it is important to show to the employees how much project knowledge management is crucial from the perspective of working in project teams. An invaluable role is also played by supporting knowledge sharing among employees and undertaking activities for organisational learning. At present, the designed solutions are being analysed in the organisation in terms of their implementation. In the future, after completing the implementation of the designed change, it would be to subject the solutions worked out to a series of reflections, thanks to which the organisation could make use of the scientific reflection made even to a greater extent.

CONCLUSION

The Museum under study is an example of a project based organisation (Sydow, Lindkvist & DeFillippi, 2004), which is a rare case when it comes to Polish cultural institutions. Including projects as a method of implementing the tasks of the Museum in its strategy shows how important role they play in this organisation. Based on the conducted research, it is noticeable from the perspective of knowledge management that the Museum of Kraków is more focused on achieving results in the form of completing subsequent projects, than on gathering knowledge about what the success factor of a given project had been. However, there are areas of project knowledge management the improvement of which could translate into more productive work and, consequently, a greater organisation success. Such areas include project knowledge sharing that is one of the elements of the project knowledge management process. The methods of knowledge management and knowledge sharing are not formalised, which causes that their implementation is dependent on the employees' recognition of the action as desirable.

As the study has shown, knowledge management processes, and in this particular case-project knowledge management, have become extremely important for public organisations. The increasing number of projects causes that organisations must look for new solutions that allow them not only to manage projects in an efficient way, but also to learn based on the projects implemented. On the basis of the completed research project, we can conclude that one of the ways to improve project knowledge management processes in public organisations is to apply action research. Owing to

this approach, practitioners in organisations, in cooperation with external experts, can work together to develop principles of better project knowledge managements. This approach allows for creating a community whose aim is to reach for *phronesis* - practical wisdom thanks to which it is possible to understand the real problems of the organisation and to fix them.

REFERENCES

- Abbasi, G. Y., & Al-Mharmah, H. A. (2000). Project management practice by the public sector in a developing country. *International Journal of Project Management*, 18(2), 105–107. doi:10.1016/S0263-7863(98)00074-X
- Anbari, F. T., Carayannis, E. G., & Voetsch, R. J. (2008). Post-project reviews as a key project management competence. *Technovation*, 28(10), 633–643. doi:10.1016/j.technovation.2007.12.001
- Aubry, M., Müller, R., Hobbs, B., & Blomquist, T. (2010). Project Management Offices in Transition. *International Journal of Project Management*, 28(8), 766–778. doi:10.1016/j.ijproman.2010.05.006
- Birkinshaw, J. (2001, March). Why is Knowledge Management So Difficult? *Business Strategy Review*, 12(1), 11–12. doi:10.1111/1467-8616.00161
- Cleland, D. I. (1985). A strategy for ongoing project evaluation. *Project Management Journal*, XVI(3), 11–17.
- Coghlan, D., & Brannick, T. (2005). Foundations. In D. Coghlan & T. Brannick (Eds.), *Doing Action Research In Your Own Organisation* (2nd ed., pp. 3–20). London: SAGE.
- Davenport, T. H., & Prusak, L. (2004). Working Knowledge: How Organizations Manage What They Know. ACM: Ubiquity, 1-2.
- Englund, R. L., Graham, R. J., & Dinsmore, P. C. (2003). *Creating the Project Office. A Manager's Guide to Leading Organizational Change*. San Francisco: Jossey-Bass.
- Gasik, S. (2011). A model of project knowledge management. *Project Management Journal*, 42(3), 23–44. doi:10.1002/pmj.20239
- Gasik, S. (2014). Model zarządzania projektami publicznymi. *Kwartalnik Naukowy Uczelni Vistula*, 2(40), 32–33.
- Gill, J., & Johnson, P. (2010). *Research Methods for Managers* (3rd ed.). London: SAGE.

Girard, J. (2018). *Knowledge Management Matters. Words of wisdom from leading practitioners* (J. Girard & J. Girard, Eds.). Macon: Sagology.

Griffin, R. W. (2012). *Fundamentals of management*. Mason: South-Western Cengage Learning.

Ekambaram, A., & Jałocha, B. (2018). Inter-project knowledge sharing in public organizations. Case study of Norwegian and Polish municipalities. In *Proceedings of the 19th European Conference on Knowledge Management (ECKM 2018)*. University of Padua.

Jashapara, A. (2011). *Knowledge Management An Integrated Approach*. New York: Prentice Hall.

Karaś, E., & Piasecka-Głuszak, A. (2013). Zarządzanie wiedzą- dlaczego tak ważne? *Nauki o zarządzaniu*, 4(17), 9-15.

Kerzner, H. (2017). Communications. In H. Kerzner (Ed.), *Project management. A systems Approach to Planning, Scheduling and Controlling* (pp. 2, 235–238). John Wiley & Sons.

King, W. R. (2009). Knowledge Management and Organizational Learning. In W. R. King (Ed.), *Knowledge Management and Organizational Learning*. Boston: Springer. doi:10.1007/978-1-4419-0011-1_1

Klincewicz, K. (2004). *Knowledge Management, development, diffusion and rejection*. Warszawa: Wydawnictwo Naukowe Wydział Zarządzania Uniwersytetu Warszawskiego.

Loebbecke, C., Fenema, P. C., & Powell, P. (2016). Managing inter-organizational knowledge sharing. *The Journal of Strategic Information Systems*, 4(1), 1–9.

MacDonald, C. (2012). Understanding Participatory Action Research: A qualitative research methodology option. *The Canadian Journal of Action Research*, 13(2), 1–11.

Madge, O.-L. (2012). Creating a Culture of Learning and Knowledge Sharing in Libraries and Information Service. In H. T. Hou (Ed.), *New Research on Knowledge Management Models and Methods* (pp. 247-256). Rijeka: In Tech.

Mazur, S. (2013). *Zarządzanie wiedzą w organizacjach publicznych*. Warszawa: Wydawnictwo Naukowe SCHOLAR.

Nemati-Anaraki, L. (2015). Infrastructures of Knowledge Sharing Countrywide. In *Handbook of Research on Effective Project Management through the Integration of Knowledge and Innovation* (p. 429). Hershey, PA: IGI Global.

Using Action Research for Improvement of Project Knowledge Management

North, K., & Kumta, G. (2018). Knowledge Management: Value Creation Through Organizational Learning. In K. North & G. Kumta (Eds.), *Knowledge Management: Value Creation Through Organizational Learning* (pp. 12–19). Cham: Springer. doi:10.1007/978-3-319-59978-6

Osborne, S. P., Radnor, Z., & Nasi, G. (2012). A New Theory for Public Service Management? Toward a (Public) Service-Dominant Approach. *American Review of Public Administration*, 3–11.

Pangil, F., & Nasurddin, A. M. (2013). Knowledge and the Importance of Knowledge Sharing in organizations. *Conference on Business Management Research* (pp. 3-7). Sintok: Universiti Utara Malaysia.

Phillips, E., Berg, M. J., Rodriguez, C., & Damion, R. (2010). A Case Study of Participatory Action Research in a Public New England Middle School: Empowerment, Constraints and Challenges. *American Journal of Community Psychology*, 46(1-2), 179–183. doi:10.1007/10464-010-9336-7 PMID:20676753

Rajkumar, S. (2010). *Art of communication in project management*. In *PMI® Research Conference: Defining the Future of Project Management* (pp. 11–12). Washington, DC: Project Management Institute.

Rosta, M. (2011). *What makes a New Public Management reform successful? An institutional analysis*. Budapest: ResearchGate. Retrieved from https://www.researchgate.net/publication/288670639_What_makes_a_New_Public_Management_reform_successful_An_institutional_analysis

Saufi, M., & Rosmaini, T. (2010). *Knowledge sharing practice in organization*. Retrieved from https://www.researchgate.net/publication/277997198_Knowledge_sharing_practice_in_organization

Schwalbe, K. (2015). Planning communications management. In K. Schwalbe (Ed.), *Information technology project management* (8th ed., pp. 398-399). Boston, MA: Cengage Learning.

Seidler-de Alwis, R., & Hartmann, E. (2008). The use of tacit knowledge within innovative companies: Knowledge management in innovative enterprises. *Journal of Knowledge Management*, 12(1), 133–134. doi:10.1108/13673270810852449

Toyama, R., & Nonaka, I. (2015). The Knowledge-creating Theory Revisited: Knowledge Creation as a Synthesizing Process. In J. S. Edwards (Ed.), *The Essentials of Knowledge Management* (pp. 95–110). London: Palgrave Macmillan.

von Zedtwitz, M. (2002). Organizational learning through post-project reviews in R&D. *R & D Management*, 32(3), 255–268. doi:10.1111/1467-9310.00258

Westerberg, K., & Hjelte, J. (2014). The story of a knowledge-based and learning organization. *Nordic Journal of Social Research*, 5, 2–3. doi:10.7577/njsr.2072

Wirick, D. W. (2009). *Public-Sector Project Management*. Wiley & Sons. doi:10.1002/9780470549131

Wyrozębski, P. (2019). Biuro zarządzania projektami (PMO). In P. Wyrozębski (Ed.), *Biuro zarządzania projektami (PMO)* (pp. 151–164). Warszawa: Polskie Wydawnictwo Ekonomiczne.

KEY TERMS AND DEFINITIONS

Action Plan: A detailed plan that defines activities that help achieving a given goal. It should specify the steps undertaken, schedule, necessary resources, and the method of verification that the assumptions have been achieved. The plan should be supported by an analysis of the environment in which the change is implemented.

Action Research: Collected research methods, the main assumption of which is to recognise the competence of members of the studied community to show its functioning and identify potential issues. Researchers involved in the Action Research stream do not impose their views on members of the studied community, but help the community in diagnosing and solving their problems.

Communication Plan: A document that helps to set expectations towards communication in a given project to all interested parties. The plan describes what information, when and in what format they should be provided, and should also contain procedures regarding the collection of information and the form of making them available.

Explicit Knowledge: Formal knowledge documented in the form of databases, documents, certificates, research, or elaborations, expressed in words and figures, possible to communicate to others.

Good Practice: Actions that bring specific and positive results that can be used in an analogous situation, which serve to enrich knowledge and improve the efficiency of operations.

Knowledge Sharing: Providing proper knowledge, relevant knowledge sources, or experience to other people, so that these people can benefit from existing knowledge.

Tacit Knowledge: Knowledge resulting from the skills, experiences, and observations of employees, which is in the minds of people and is not recorded anywhere.

Chapter 7

Understanding the Dynamics of Knowledge Management Tools in Two Public Universities in Delhi, India

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ABSTRACT

The chapter aims to explore the dynamics of knowledge management (KM) in terms of information and communication technologies (ICT) and KM tools in higher education institutions (HEIs). The various KM and ICT tools and their applicability are discussed in detail in two public universities in Delhi, India. The chapter is the result of the literature review pertaining to the changing educational ecosystem. A comprehensive review of peer-reviewed journal articles, books, and research papers has been carried out in the area of KM, ICT tools, and education. Forty-six KM tools extracted from four KM toolkits, and 12 ICT tools were tested. A survey with the 542 students, 112 faculty, and 48 administrators was conducted (separate for each category). The findings reveal that some of the ICT and KM tools have a significant presence in universities. These tools have not only enhanced knowledge sharing but also intensified the learning experience of the users.

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INTRODUCTION

The progress of a nation largely depends on its system of education, which in turn has the capacity to do justice to its clients (students) if it can make available the right knowledge at the right time and enable a person to take the right decision (Jain & Gupta, 2019). The foundation of modern society is knowledge and knowledge is used to acquire more knowledge (Sinha et al., 2012). The new age economies have realized this fact and massively investing in their future workforce using KM; using ICT as an enabler. The conventional approach for KM usually examines knowledge as a commodity, however, today it is viewed as shaping virtual communities through collaboration, expansion, communication and excelling through collective intelligence. Although knowledge is defined as a commodity or as the outcome; it should be complemented with a deeper understanding of social, technical, and organizational aspects of the context in which KM is to be employed (dePaula & Fischer, 2005). These aspects help in uncovering the opportunities and challenges in an organizational setting. In light of this, the author proposes to write a chapter focusing on two public universities in Delhi, India.

There has been a lot of stress on KM in the corporate world but the educational sector is not discussed as extensively in the discussion on KM. Also, the parameters for KM in universities are not similar to those of business organizations. However, education is subject to the same pressures as a business, it has to spur innovation, improve customer service and achieve operational excellence (Gupta & Jain, 2017). The need for research in the area of KM and its applicability in higher education is gaining popularity but there is a dearth of literature in this domain. To fill this gap, the author proposes to write a chapter entitled, “Understanding the Dynamics of Knowledge Management Tools in Two Public Universities in Delhi, India” keeping the interest of policymakers, researchers and other stakeholders in mind, while studying the subject of KM implementation in the public universities.

India enjoys a unique position, having one of the largest networks of HEIs in the world. About 50 percent of its population is under the age of 25 years and this demographic dividend is expected to peak by 2020 as per the economic survey of 2017 (Sethi, 2017). Using this demographic dividend optimally, with the catalyst of KM tools added on, India can create a niche for itself. A large number of tools are deemed to be effective in KM. The author has examined, evaluated and organized KM tools, with KM taxonomy and their applicability in a university setting in mind. The chapter offers an insight into the varying applicability of various ICT and KM tools to the educational sector, aimed at enhancing performance.

The objectives of the chapter are:

1. To familiarize the readers about the taxonomy of KM Tools and their relevance in a university. The organization of the tools are as follows:
 - a. KM tools for stimulating creativity, generating new ideas.
 - b. KM tools for learning and sharing lessons within groups.
 - c. KM tools for learning from experts.
 - d. KM tools for learning before, during and after a project/ initiative.
 - e. KM tools for developing and improving a shared practice or area of work.
 - f. KM tools for running effective in-person knowledge events.
 - g. KM tools for locating expertise and experts.
 - h. Strategical KM tools.
 - i. KM tools for organizational learning.
 - j. ICT tools acting as catalyst for KM tools.
2. To understand the role of public universities in the education of a country like India that has low per capita income and high density of youth.
3. To explain the application of KM and ICT tools in the university setting for the various stakeholders i.e. students, faculty and administration.
4. To assess the level of applicability of these KM and ICT tools in the above mentioned two public universities through surveys and interviews of different stakeholders. This includes the parameters in terms of depth, coverage, formality and receptivity.
5. To assess the level of fitness of these KM tools in formal and informal backgrounds, ICT enabled and people-centric KM tools for creating an ecosystem.
6. To highlight the importance and benefits of KM tools in these universities for unlocking untapped potential.

Data is collected using interviews and surveys with various stakeholders including students, faculty and administrators. The scope is limited to the usage and applicability of various ICT and KM tools in two universities among both students and faculty. This also covers the receptivity of KM tools in formal and informal settings, information and communication technology-enabled and people-centric tools. This will, in turn, bring out usage pattern and help create an environment of conducive to KM in the university level.

The chapter is organized as follows: in the first section, the author presents an introduction. The second section provides a background of the antecedents of KM. There is a brief preview of the related concepts in this section. This is followed by the methodology and a discussion on various ICT and KM tools. The fourth section has the results and application of KM tools in the university setting. The chapter concludes with future research direction and conclusion.

BACKGROUND

Experts postulate that knowledge and its manipulation is the source of lasting competitive advantage (Nonaka, 1991; Sinha et al., 2015). The author believes that it is an exciting time when a fundamental restructuring of education is happening worldwide. Education is continuously evolving, and coupling education with KM can provide better learning opportunities and experiences like never before (Gupta and Jain, 2017).

1. Knowledge Management

KM is a widely used concept in business management discussions and hence has been widely investigated in different contexts (Miozzo et al., 2016), in different industries (Bigliardi, Galati & Petroni, 2014) and in different countries (Mertins et al., 2001; Gupta & Chopra, 2018). Knowledge should be captured, stored and shared competently for those who wish to access and learn from it. KM is a discipline that promotes an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all of an enterprise's information assets (Duhon, 1998).

Globalization, internationalization and increasing competition raise the importance of knowledge, as traditional factors of production and technological superiority are not sufficient any longer to successfully compete in a market (Friehs, 2003). In the knowledge-driven culture, KM has become very crucial in the educational context. This has heightened the pressure on HEIs in terms of academics, research, patents and ranking. The advent of the latest technology and ICT tools has posed unique challenges for these institutions. At the same time, some institutions have converted these challenges into opportunities. In third world countries, HEIs are striving to signify their engagement, competence, commitment and excellence through their research output, patents, ranking and performance. The challenge is to capture, process, share the knowledge that is generated to enhance the performance, creation of new knowledge and build the intellectual capital. A comprehension of the types of knowledge is imperative in understanding KM.

2. Types of Knowledge

According to Polanyi (1967), knowledge can be categorized as explicit and tacit knowledge. Explicit or codified knowledge is the knowledge that can be transmittable through formal and systematic languages. However, tacit knowledge is more personal and subjective, making it tough to be formalized and communicated. The author through the various ICT and KM tools has incorporated the dimensions of explicit as well as tacit knowledge. For this research, the author has not differentiated the tools

on the basis of types of knowledge as Nonaka (1994) stated that the individuals are able to recreate their own systems of knowledge to accommodate ambiguity, noise, and randomness generated in the organization in its interaction with the external environment.

3. Knowledge Management Tools

KM is an effective catalyst for stimulating development processes in a university. Learning from peers has become a new way of learning and is an attempt to reduce the dependence on learning from books. The new peer-learning is more convincing and offers pragmatic insights to the issues.

The World Bank has developed and tested a range of KM tools, incorporating lessons from over 100 exchange programs designed to deliver maximum impact. Complemented by the support of trained knowledge exchange facilitators, these tools form the bedrock of the KM approach. HEIs involved in knowledge exchange can extend their knowledge-sharing ability from these KM tools. ICT tools can support the KM tools in knowledge creation, its storage and retrieval. The tools also assist in knowledge sharing and its application in organizational learning. The recent advancements around the internet and associated technologies have generated significant rigor and enthusiasm in KM. This has led to create immense possibilities to share explicit knowledge with peers economically. It has also been established that sharing, applying and transferring this knowledge begins new knowledge creation and better utilization of existing knowledge.

4. Information and Communication Technologies Tools

ICT tools are viewed as a powerful enabler for KM initiatives. ICT and KM tools in higher education are making the right knowledge available to the right person at the right time (Aranganathan & Lakshmi, 2010). ICT tools are employed for communication, collaboration and networking functionality. They facilitate knowledge capture, storage, structure, dissemination and creation.

The literature suggests that communication technology, massive open online courseware, social networking sites, blogs, real simple syndication and YouTube are creating new possibilities and avenues of collaborative learning by transforming the traditional class and teacher-centric system (Yadav et al., 2017). In the presence of these tools, the classroom teaching has got a different dimension and the pedagogy has transformed into a more engaged, connected and comprehensive learning.

5. Contribution of Education in India and Higher Education Institutions

The contribution of education in a country like India that has low per capita income and high density of youth is distinctive. India is unique as 50% of its population is under 25 years of age. People have a good knowledge of English and can speak more than one language. India is the single largest provider of global talent and is amongst the top 5 countries globally in cited research output. It has 23 universities among the global top 200, going from none two decades ago. Over the last two decades, India has remarkably transformed its higher education landscape. It has created widespread access to low-cost high-quality university education for students of all levels (FICCI Higher Education Summit 2013).

Higher education institutes provide education through universities, community colleges, liberal arts colleges, institutes of technology and other collegiate-level institutions that award academic degrees or professional certifications (Sulaiman et al., 2010). HEIs in India include universities, colleges, and other institutions. The universities award their own degrees, and colleges award degrees through the universities to which they are affiliated (Policy Brief, 2015). Public universities are the first choice of students as they offer quality education, with a reasonable fee structure. In light of this, it is pertinent to understand the contribution of public universities.

6. Contribution of Public Universities

Focusing on the significance of KM in HEIs is important so as to understand the readiness of universities in maintaining a knowledge-based society for sharing quality resources, expertise, research practices, and collaboration (Jandaghi et al., 2014; Petrides & Nodine, 2003). India has the third largest higher education system in the world, after the US and China, according to the World Bank (Reddy, 2019). Higher Education sector in India has observed an enormous transformation since Independence. The number of universities has increased 34 times from 20 in 1950 to 903 in 2018. Also, the student enrolment has grown considerably to 3,66,42,378 in 2017-18 (MHRD, 2016).

The Department of Higher Education, Ministry of Human Resource Development, is accountable for the growth of HEIs. Under a planned development process, the department looks after expansion of access and qualitative improvement in the Higher Education, through world-class Universities, Colleges and other Institutions (MHRD, 2016). Among 903 Universities, 343 Universities are privately managed (MHRD, 2018). This implies the tremendous contribution of the public universities in India

which are providing access to quality education to the masses. Higher Education is the shared responsibility of both the Centre and the States.

The universities have been recognized as knowledge-based organizations engaged in knowledge codification, knowledge creation, knowledge sharing, knowledge dissemination and learning (Goddard, 1998; Trifonova & Ronchetti, 2006). The experts have to understand that:

- Universities are increasingly included knowledge-workers making their choices regarding the type of work they do, whom to interact with, what KM tools are relevant to fulfil the goals.
- Universities are full of experts and expertise (both explicit and tacit knowledge) need to be captured for the individual, group and organizational learning.

For the purpose of assessing the applicability of the KM tools, two universities are selected: University of Delhi and Delhi Technological University. The University of Delhi is a premier university established in 1922 and has earned international acclaim for high academic standards, diverse educational programs, distinguished faculty and illustrious alumni. Delhi Technological University is among the oldest engineering colleges of India, established in 1941 under the aegis of Government of India. It has received many accolades and has a wide and successful alumni base spread across all sectors.

METHODOLOGY

In total, four KM toolkits and 60 KM tools were tested. In addition to these KM tools, 12 ICT tools which are providing the functionality of the KM tools in the virtual world are also tested. The reason to include these 12 ICT tools is that they are no longer separated from the KM tools. They are in a way taken over the KM tools and have provided a flexible yet practical dimension to the KM tools.

The determination of the tools for the survey was based on:

- Their application in the public university.
- Their coverage in the literature and available toolkits.
- The results of the discussions of the focus groups with experts and stakeholders.

A three-step process is followed: In step one, focus groups are conducted (face-to-face) to get the inputs of the stakeholders. After the discussions, a questionnaire is

designed which is pilot tested in step two. The final step is to finalize the questionnaire based on the results of the pilot testing for the survey.

Out of the four toolkits, the KM tools are the adaptation of the toolkit: Knowledge Exchange Toolbox, conceived for UNICEF staff and partners. The availability of the toolkit in the public domain and its flexibility, relevance and accessibility is the primary reason to select the toolkit. The toolkit is a comprehensive list of KM tools relevant for knowledge capturing, sharing, transferring, and knowledge creation. Also, the toolkit is applicable in the context of a university because of its application. The tools discussed can be applied individually, group or at the organizational level. However, certain modifications have been made after thorough discussions with the experts. Some categories were merged for simplified and practical understanding. Some new KM tools were also added keeping Indian universities and its characteristics in mind. Moreover, some KM tools were also removed which were found less significant during the pilot study. Finally, 46 KM tools divided into nine categories were selected. Today's generation is quickly adapting to technology and is excited to learn with new technological tools. ICT has increased student engagement and thereby their performance (Choi et al., 2010; Andreeva & Kianto, 2012; Pérez-Lopez & Alegre, 2012; Rasula et al., 2012; Jain & Gupta, 2019). In addition to these 46 KM tools, 12 ICT tools complementing these KM tools were also introduced by the author.

A brief description of the tools is also provided in table 1. In addition to this, 12 ICT tools used for one or the other KM tools were also tested. The KM tools are categorized into three categories relevant for students, faculty and the administration. Survey was conducted with the students, faculty and administrators using a google form explaining the objectives. The forms were sent using the various forums and google groups. A self-administered questionnaire with 542 usable responses from students (245 from University of Delhi and 297 from Delhi Technological University); 112 from faculty (53 from University of Delhi and 58 from Delhi Technological University) and 48 from administrators (23 from University of Delhi and 25 from Delhi Technological University) were gathered. The participants spanned across various departments and streams to have a holistic view of the applicability of the tools. To administer the analysis, the questionnaire was designed on a seven-point Likert scale with statements ranging from All the time to Never.

The universities were selected on the basis of their knowledge-intensive culture with the best of the talent pool in the public university's domain. The faculty and administrators were invited to have focus group discussions (face to face) to get the inputs including the ICT and KM tools being used by them. Respondents were asked to provide their inputs and feedback to have a better understanding of usage of KM tools in their working. The discussions were focused on the KM tools used by the stakeholders in terms of depth, coverage, formality and receptivity. Faculty from

various departments were involved in the process. 22 sessions were conducted with faculty with detailed discussions and transcription for future reference. Regarding the administration, both management and staff participated in 11 sessions. Seven follow up sessions (five with faculty and two with administrators) were also held for further probing and clarity of doubts.

The study is an effort to fill the gap where there is a dearth of conceptual as well as empirical studies considering the applicability of ICT and KM tools in educational institutions. The author has not come across any comprehensive study so far in the context of educational institution. This study will provide a ground for future research and literature. Even though the interest in KM is increasing in practitioners and experts, in the light of limited literature, this study will give a confidence and validation for associated research problems. There are certain limitations also like the number of students and only two universities were considered.

ORGANIZATION OF TOOLS

This chapter is an attempt to assess the applicability of the range of ICT and KM tools in the HEIs to manage knowledge resources. ICT tools provide a platform for KM-related activities, such as online storage, virtual COPs, emails, live streaming, online video conferencing, virtual classrooms, online discussion forums, virtual brainstorming, instant messaging and chat. These ICT tools enable to capture, store, share, transfer and create knowledge in the university. These tools help the stakeholders to have common access to knowledge. In a way, these tools contribute to a platform for social capital and enhanced communications irrespective of time and space. These tools are very significant in the context of public universities because of the absence of sophisticated KM systems. The 12 ICT tools are:

1. Blogs
2. eBooks
3. Facebook
4. Google Groups
5. LinkedIn
6. MOOCs
7. Quora
8. Research Gate
9. Skype
10. WhatsApp
11. Wikis
12. YouTube

The idea of identifying, capturing, storing, transferring and creating knowledge within or outside the organization, beyond the limits of space and time is augmenting attention. With the advent of ICT, a shift from getting the knowledge to gaining knowledge has emerged. This new reinforcement of knowledge and learning has tremendously improved the quality of work and its outcomes. The movement has led to the widespread adoption of learning and knowledge-based strategies among the range of agencies involved in such work (Ramalingam, 2006).

The chapter recommends a framework to appraise KM tools in HEIs. There are nine categories of KM tools. The categories span from learning from peers to learning from experts; learning before, during and after a project/ initiative to organizational learning; running effective in-person knowledge events to locating expertise and experts; and stimulating creativity, generating new ideas to strategical tools. The categories are as follows:

1. Stimulating creativity, generating new ideas.
2. Learning and sharing lessons within groups.
3. Learning from experts.
4. Learning before, during and after a project/ initiative.
5. Developing and improving a shared practice or area of work.
6. Running effective in-person knowledge events.
7. Locating expertise and experts.
8. Strategical tools.
9. Organizational learning.

1. Stimulating Creativity, Generating New Ideas

The first category discusses creativity and generating new ideas in the university ecosystem. This is for explaining specific classified challenges, serving into specific outputs with creative thinking. The universities are the breeding ground for creative ideas (Correspondent, 2014). The creativity helps the students in various dimensions like placements, start-ups, research and further studies. It is also the key aspect of the teaching professionals as their research and career advancements are majorly dependent upon their creative ideas in terms of pedagogy, research domain and patents. The KM tools that are used for stimulating creativity are Brainstorming, Topsy-Turvy, VIPP Card, Collection and Clustering, World Café, Buzz Groups, Exchange Visits and Online Jam. Students across disciplines come together to solve problems at hand through collective brainstorming and teamwork (Jain & Gupta, 2019).

Understanding the Dynamics of Knowledge Management Tools in Two Public Universities

Table 1. Categories of Knowledge Management tools

Category	Process	Tools	Description
1	Stimulating creativity, generating new ideas	Brainstorming	Expand a group's creativity using a versatile, familiar, and powerful tool.
		Topsy Turvy	Take an innovative approach to brainstorming.
		VIPP Card Collection and Clustering	Gather diverse creative inputs and organize them as a group.
		World Café	Apply the power of small-group conversations to gather input on multiple issues.
		Buzz Groups	Add quick, easy creative conversations to any plenary meeting.
		Exchange Visits	Tool to foster knowledge exchange, learning and generating new ideas.
		Online Jam	Convene a group online at a fixed time for brainstorming (text-based).
2	Learning and sharing lessons within groups	VIPP Card Collection and Clustering	Classify and prioritize learnings together.
		World Café	Learn in small groups that allow conversations, questions and answers.
		Buzz Groups	Complement standard presentations by adding short conversations and sharing among participants.
		Appreciative Inquiry	Examples of success in past that can be learned to create greater success in the future.
		E-discussion	Conduct an online discussion overtime contributing and helping develop answers to key policy for team learning.
3	Learning from experts	Lightning Talk	Encouraging focused, dynamic presentations to accommodate several presenters in a limited time.
		Expert Interview (with audience)	Offer a dynamic, engaging alternative to traditional expert presentations in-person where participants take the lead in asking questions.
		Fishbowl	Offer a spontaneous, conversational alternative to traditional expert presentations where participants ask questions and can replace experts as speakers.
		Chat Show	Hold a learning conversation with several experts at once where facilitator takes the lead in asking questions and animating the discussion.
		Buzz Groups	Complement standard presentations by adding short conversations and sharing among participants.
		Webinar	Convene a group online at a fixed time for experts sharing audio-visual presentations and disseminating new guidance to key audiences. Also conduct training on important new tools, methods or procedures.
		Peer Assist / Peer Review	A team of people who are working on a project or activity call a meeting to seek knowledge and insights from people in other teams.
		Mentoring	An experienced individual teaches and trains someone with less knowledge.
		Facilitation	Addressing a topic with purpose and efficiency and working together to achieve results.
		Online Jam (Ask Me Anything version)	Convene a group online at a fixed time for brainstorming (text-based with experts with unique, relevant experiences to share.

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Understanding the Dynamics of Knowledge Management Tools in Two Public Universities

Table 1. Continued

Category	Process	Tools	Description
4	Learning before, during and after a project/ initiative	SWOT	Plan effectively for any type of project, either quickly or in depth and analyse important decisions, proposals or problems.
		VIPP Card Collection and Clustering	Quickly identify and prioritize relevant issues.
		Timeline	Building a shared understanding among your team of current opportunities and challenges in a project/ initiative.
		Online Communities	Learn from others who have tackled similar challenges and build a strong foundation of practical knowledge over time, which can be applied as needed in different activities.
		Virtual Peer Assist	Learn from others having similar challenges and hold a single focused learning event online.
		Surveys	Efficiently identify priorities and issues for later action.
		After Action Review	Continuously improve team effectiveness and results during a project.
		Retrospect	Carry out in-depth team reflection in order to capture and prioritize lessons, and improve results.
		Debrief (one-on-one)	Capture lessons on potentially sensitive topics from individuals in a confidential setting timeline and understand the how and why of project results.
		Lessons Learned (template)	Write up lessons for future use.
5	Developing and improving a shared practice or area of work	World Café	Learn in small groups that allow conversations, questions and answers having flexibility and adaption to many different circumstances.
		Open Space	Meeting method that helps individuals and groups become more effective in work environments that are rapidly changing by developing their skills as collaborative problem solvers and lifelong learners.
		Horizontal Evaluation	Sharing of information, experiences and knowledge; the building of trust and a sense of community, which in turn fosters knowledge exchange; the social or interactive learning and corrective action needed to improve R & D methodologies; and the adaptation and wider use of these methodologies.
		Ritual Dissent	Testing and enhancing sketched ideas, drafted proposals, strategies, etc. by subjecting them to peers challenging them. It is a listening technique, not a dialogue or discourse.
		Knowledge Fair	A knowledge fair is an event designed to showcase information about an organization or a topic. It can be organized in many ways using speakers, demonstrations, or more commonly, booths displaying information of interest to the attendance.
		Storytelling	Using a range of techniques to engage, involve and inspire people, using language that is more authentic and a narrative form to make it interesting.
		Brown Bag Lunch	Structured social gathering during an organizational lunch time period for the purpose of transferring knowledge, building trust, social learning, problem solving, establishing networking or brain storming.
		Online Communities	Leverage the power of networking for building capacity over time, solving problems and answering key questions as they arise.

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Table 1. Continued

Category	Process	Tools	Description
6	Running effective in-person knowledge events	Icebreakers	Building trust, promote connecting and sharing among participants.
		Real-Time Meeting Evaluation Tools	Evaluating the success of an event while it is happening, to iterate and maximize the event's impact.
		Meeting Facilitation (a skill, not a tool)	Promoting participation, avoid or resolve meeting-related problems and maximize results, during any and all in-person knowledge events.
7	Locating expertise and experts	Knowledge Maps	Providing a visualization for a knowledge domain and structure of knowledge.
		Knowledge network	A process of human and computer networking where people share information, knowledge and experiences to develop new knowledge for handling new situations.
		Yellow Pages	Helping people find others in their organization who have the knowledge and expertise they need for a particular task or project.
8	Strategical tools	Balanced scorecard (BSC)	Executing and monitoring the organizational strategy by using a combination of financial and non-financial measures.
		Stakeholder Analysis and Mapping	Identifying and analysing the stakeholders involved and their interrelations. Sets the domain of people, groups and organizations whose interests and influence on policy should be taken into account when conducting the impact analysis for a particular policy.
		Good Practices	Learning from others and to reuse knowledge.
		SWOT	Evaluating the Strengths, Weaknesses, Opportunities, and Threats involved in a project or in any other situation of an organization requiring a decision in pursuit of an objective.
		Knowledge Audits	Understanding where an organization stands in terms of knowledge management and its knowledge assets.
9	Organizational learning	Exit Interviews	Feedback on why employees are leaving, what they liked or didn't like about their employment and what areas of the organisation they feel need improvement.
		Experience Capitalization	Key stakeholders transform individual and institutional experience and knowledge into capital that can be used in future.
		Critical Incident Technique	Analysing and unearthing the problem-solving behaviour of people. It points a critical problem situation and packs it into a short story.
		Focus Groups	Understanding a problem from the perspective of a certain group. Used to develop a programme logic model into various perceptions on a given topic. Pilot testing programme ideas, services or policies.

Source: (adapted from (Knowledge Exchange Toolbox) Arivananthan, 2015)

2. Learning and Sharing Lessons Within Groups

Learning and sharing is an important dimension of KM. This is the first stage of new knowledge creation. In this past pace, where knowledge workers don't have enough time for interaction, learning and sharing are difficult in a university setting. However, intellectual assets are the result of learning and sharing knowledge among the various stakeholders. There are various groups which span students, faculty,

experts, industry professionals who share and learn with each other. The KM tools are very important for peer-to-peer learning in groups, where the members identify, discuss and prioritize key facts, ideas, experiences and other knowledge together (Arivanathan, 2015).

3. Learning from Experts

Learning from peers can be more of knowledge sharing but knowledge elicitation from experts is the key for a competitive edge. In this changing workplace where the virtual world is dominating, learning from experts has become easy. Now with the advent of various ICT tools, gaining new knowledge from experts real-time has penetrated in the university culture. Students and faculty are learning from experts which help them to get acquainted with contemporary domains. In-depth knowledge of specialized domains from experts is a major learning in a university.

4. Learning Before, During and After a Project/ Initiative

The learnings should be documented rather reinventing the wheel. The key learnings before, during and after the project saves a lot of time and efforts in future projects. This also provides new insights and can be the base for value addition. It provides clarity of thoughts and efforts leading to enhanced planning and coordination among the team members. These lessons can be the reference points in future initiatives and help the new incumbents to have preparedness for the events. This helps in efficient planning and decision-making, consolidating the appropriate knowledge into plans. Formally capturing the knowledge in terms of lessons learned that can be practiced in the subsequent phases of the projects is highly significant.

5. Developing and Improving a Shared Practice or Area of Work

The knowledge cannot be shared unless members have a sense of belongingness and trust. In order to improve social capital, developing and improving a shared practice of work is the foundation. People share and contribute more when they relate to each other and have a sense for the common objective. The KM tools help them to overcome their inhibitions and have a better understanding of each other. Creative criticism also helps them to reach out to each other in difficult situations. Building collaborative professional networks for enhanced organizational learning sharpening organizational practices for success. This involves laying a foundation for the collaborative professional interface to intensify KM in the organization.

6. Running Effective in-person Knowledge Events

Tools like Icebreakers, Real-Time Meeting Evaluation Tools and Meeting Facilitation are very important for in-person knowledge events. These events facilitate knowledge sharing and interaction in knowledge events. The interaction during these events plays a very crucial role in the next stages of knowledge sharing and creation. This phase leads to generate similar cerebral models for prospective knowledge sharing.

7. Locating Expertise and Experts

The KM tools for locating experts in the university for tacit knowledge are very significant. In the light of interdisciplinary domains, students and faculty come across unavailability of requisite expertise in their respective departments. KM tools like Knowledge Maps, Knowledge Network and Yellow Pages provide a platform to locate and associate with the experts. These tools assist them to interact with specialists and get the imperative direction.

8. Strategic Tools

The strategy is the lifeline of any university. If the strategy is accurate considering the perspective of all the stakeholders, the university can achieve higher intellectual capital resulting in better accreditation and rankings. The KM tools which promote this are Balanced Scorecard (BSC), Stakeholder Analysis and Mapping, Good Practices, SWOT and Knowledge Audits. A university's strategic approach in KM can guide its success, progress and extension. Using these instruments in an effective way, the leaders can take the university to higher levels of competence.

9. Organizational Learning

Knowledge is not the sole product of an individual. The knowledge creation spiral is not complete unless it is converted into organizational learning. The individual knowledge will be converted into group knowledge eventually transforming into organizational learning. Also, knowledge workers will move from one university to another but their intelligence should be converted into organizational intellect.

RESULTS

KM process is based on the ability of all the stakeholders of the organization to add value to the basic business processes through the creation, communication, codification, and coordination of both explicit and tacit knowledge stores (Nonaka & Takeuchi, 1995). The survey reviewed the tools used by the various stakeholders in a university. The results are as follows:

Table 2. Application of information and communication technologies tools (students)

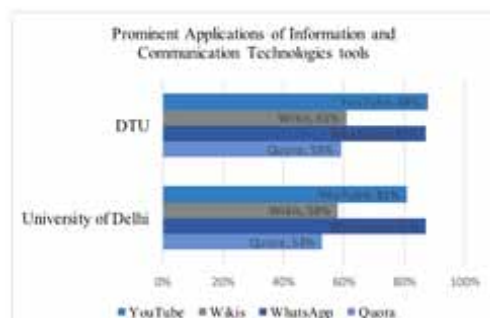
Name of the Tool	ICT Tools													
	All the time		Extensively		Moderately		Neutral		Rarely		Never		Can't say	
	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU
1	3	5	9	8	21	25	11	16	16	20	31	20	9	6
2	12	11	16	15	16	17	18	16	12	14	14	14	12	13
3	7	5	10	6	13	9	9	12	12	15	40	44	9	9
4	7	6	14	12	18	19	14	11	10	10	26	36	11	6
5	3	6	7	6	19	18	11	18	15	14	31	35	14	3
6	1	7	4	9	18	20	14	11	9	14	37	30	17	9
7	12	9	18	15	23	35	12	13	15	15	15	11	5	2
8	5	5	13	10	19	20	19	26	12	17	21	18	11	4
9	3	2	4	5	11	9	19	20	21	23	16	13	26	28
10	36	37	27	26	24	24	7	9	4	3	2	1	0	0
11	9	10	22	15	27	36	12	22	12	6	14	9	4	2
12	27	32	33	39	21	17	6	5	10	5	2	2	1	0

Drifts in technology advancements are reshaping the existing models and removing the barriers of formality and informality in the students' learning process. Growing up with unparalleled access to ICT has revolutionized the way millennials communicate, express, network, socialize and learn. The results are similar in both universities. Around 87% of the students in both the universities use WhatsApp for academic purposes (moderately to all the time). YouTube is also used for academic purposes (81% by the University of Delhi and 88% by the students of DTU). The research supports the idea that YouTube is an innovative learning tool (Park, 2009; White, 2009; Losh, 2011; Lee & Lehto, 2013; Orús et al., 2016; Yadav et al., 2017). Wikis and Quora are also used more than 50% by the students of both the universities (refer Table 1). Being open source and easily accessible, Wikis are expanding acceptance as a learning vehicle in HEIs (Bower et al., 2006; Choy & Ng, 2007, Elgort, 2007; Noa Aharony, 2008; Donne, 2012).

Out of these 12 ICT tools, the prominent four (moderately to all the time) are WhatsApp, YouTube, Wikis and Quora (refer Figure 1). The applications which are meant for pleasure have taken a new aspect contributing as a gateway to academics. The functionality of these applications has removed the limitations of formality in the academic domain of student's community helping them to have seamless and enriched communication for KM.

The emerging themes like MOOCs, Blogs and Research Gate have not been able to discern the student's community completely. These tools are still at the nascent stage and will take time to become popular among the students. However, during the discussions, it was affirmed by the students that these tools have assisted the students who are working in niche areas. In light of this, these tools are catering to the students who are confined in number. The application of books is also subduing among students. It is less than 50% (eBooks) which signifies the usage of additional

Figure 1. Prominent applications of information and communication technologies tools

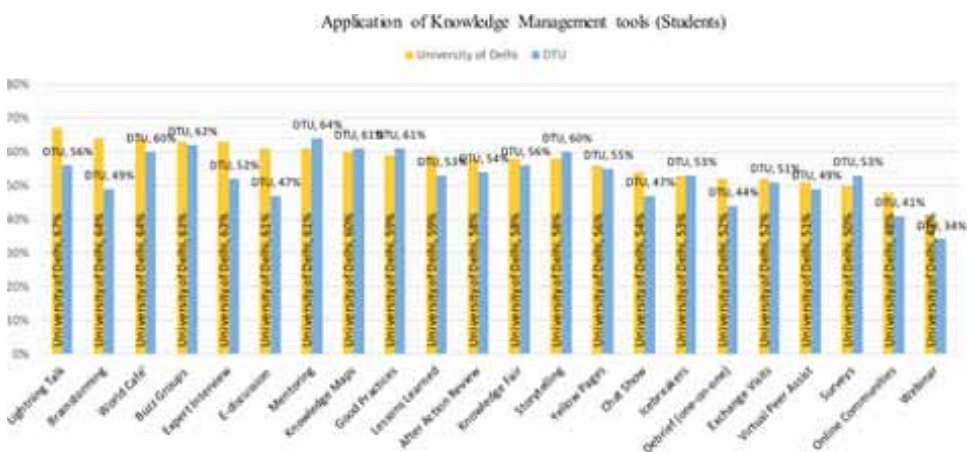


material for educational purposes. The students are relating to other material preferably books for academic tenacity.

The KM tools have been used broadly by the students. Webinars and Online communities are used less than 50% (Moderately to All the time) by the students of University of Delhi. KM tools like Brainstorming, Buzz Groups, E-discussion, Expert Interview, Knowledge Maps, Lightning Talk, Mentoring and World Café', are utilized more than 60% (refer Figure 2). This signifies that there is a high insertion of KM in academic activities. During the discussions, it was noted that these KM tools are not followed formally but the presence is widespread. The millennials are enthusiastic to learn new topics in a swift way that's the reason Lightning Talks has the highest percentage (67%). Learning in a group having a cohesive working area is also an antecedence for the students. This is explicitly revealed in the survey where the students have embraced World Café' and Buzz Groups as the KM tools for learning. In the student's community, it was found that 64% of the University of Delhi students use Brainstorming. The discussions with their companions and experts are a great way of acquiring knowledge for the students today where ICT has eliminated many barriers to connect with like-minded people. This ICT enabled ecosystem is shaping a new way of learning.

After Action Review, Buzz Groups, Exchange Visits, Expert Interview, Good Practices, Icebreakers, Knowledge Fair, Knowledge Maps, Lessons Learned, Lightning Talk, Mentoring, Storytelling, Surveys, World Café' and Yellow Pages are the KM tools that are practiced more than 50% by the students of Delhi Technological University (Moderately to All the time). Other KM tools are used less frequently. However, there are some tools which are having similar usage pattern. Tools like Webinar and Online communities are used less frequently than other KM tools.

Figure 2. Applications of knowledge management tools (students)



The KM tools that have importance for the students of scientific backgrounds have highlighted the significance of Mentoring and Buzz Groups. Good Practices and Knowledge Maps are also an indispensable part of DTU students' community where tried and tested practices are shared from seniors to juniors. World Café' providing a platform to discover from others in an informal setting is also followed by pupils. Storytelling is an approach which can both allow for the expression of tacit knowledge and increase the potential for meaningful knowledge sharing, particularly by permitting learning to take place through the presence of a narrative structure (Ramalingam, 2006). Storytelling having a great influence on juniors complements other KM tools where the experience is shared using the story as a method for interacting. It was also affirmed that Exchange Visits are an elemental component of KM in the universities fostering knowledge exchange, learning and generating new ideas.

More than 80% of faculty (in both the universities) use WhatsApp for academic objectives (Moderately to All the Time, refer Table 3). This ICT tool has enormous potential in the academic context. The other ICT tools including eBooks, Research Gate, Wikis and YouTube are also used widely (more than 60%). The ease and unrestricted availability of these tools have encouraged the faculty to move out of the formal barriers and create avenues for research and development. eBooks have also extended the potential of augmenting and sharing knowledge from conventional methods of learning. Now, the teachers can virtually visit a library or a portal, peruse a book and get it. Research Gate, on the other hand, formulated a new realm for research where peer research can be shared, analyzed, and distinct research areas could also be conceived through collaborations. The trainers are now equipped using Wikis and YouTube content barring the canonical aids of learning. Wikis endeavor to provide a platform for collaborative projects with unrestricted writing and ideation for faculty. Wikis are expanding recognition in academia as a learning tool.

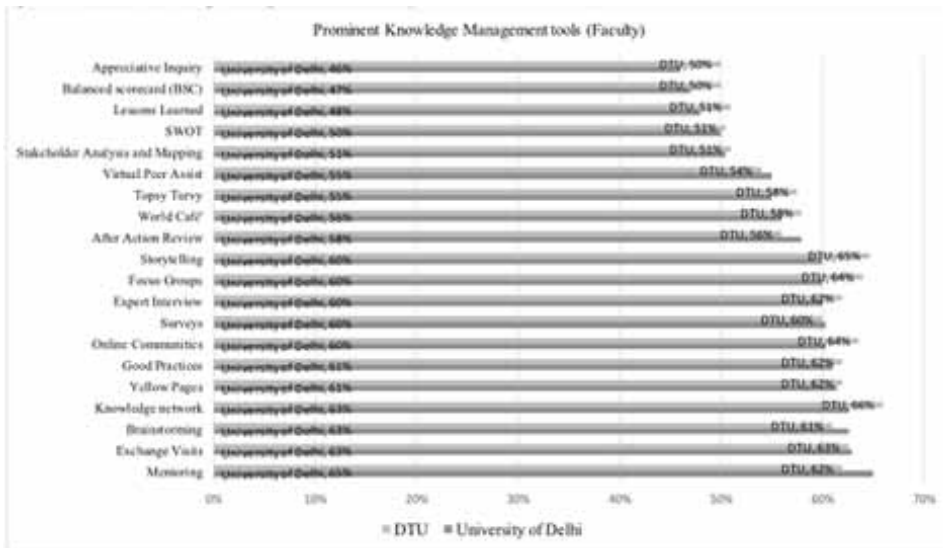
The less-chosen are Blogs, Facebook, Google Groups, LinkedIn, Quora and Skype (less than 50%). The tools are not used often by faculty and their application is at the nascent stage. Time will tell the future of these tools.

The following KM tools (refer Figure 3) are used widely by the faculty: Brainstorming, Exchange Visits, Expert Interview, Focus Groups, Good Practices, Knowledge network, Mentoring, Online Communities, Storytelling, Surveys and Yellow Pages. The faculty used them frequently more than 60% (Moderately to All the time) for knowledge codification, coordination, transfer, dissemination and creation. If the organisation is not getting a steady stream of new ideas, a focus on the old ideas runs the risk of current work being obsolete before it is even finished. (Sinha et al., 2009). Brainstorming is a great way to extend a group's creativity using a versatile, familiar, and influential tool. This includes routine responsibilities and research pursuits. One of the most significant augmentations of KM is the

Table 3. Application of information and communication technologies tools (faculty)

Name of the Tool	ICT Tools													
	All the time		Extensively		Moderately		Neutral		Rarely		Never		Can't Say	
	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU
1 Blogs	12	11	12	14	15	16	10	11	16	20	25	20	10	9
2 eBooks	22	23	17	17	21	21	15	10	10	7	7	9	8	13
3 Facebook	11	9	13	13	15	11	15	19	11	12	19	19	16	17
4 Google Groups	12	16	14	12	18	19	14	11	9	10	21	26	11	6
5 LinkedIn	12	14	15	18	16	13	12	14	13	11	18	20	14	10
6 MOOCs	13	12	18	19	26	23	10	8	9	14	10	11	14	13
7 Quora	12	9	14	15	20	21	12	14	15	16	15	16	13	9
8 Research Gate	19	20	25	23	21	23	8	7	9	11	9	11	9	5
9 Skype	15	14	11	13	19	18	18	19	15	18	10	7	12	11
10 WhatsApp	32	31	25	26	23	24	7	9	9	7	4	3	0	0
11 Wikis	14	10	22	15	27	36	12	22	10	6	11	9	4	2
12 YouTube	23	22	19	17	19	21	15	16	14	12	8	9	2	3

Figure 3. Prominent knowledge management tools (faculty)

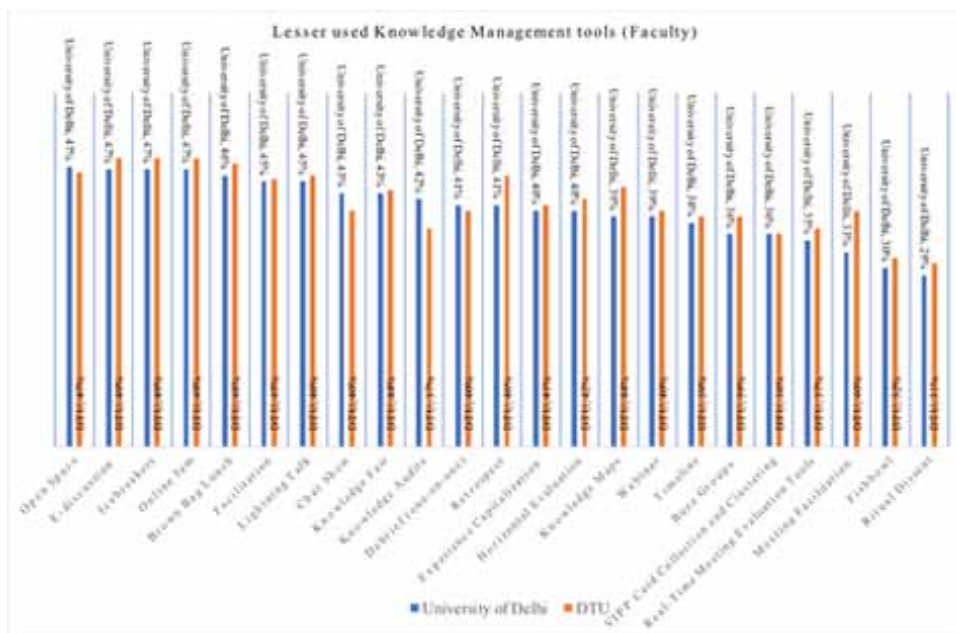


appreciation of the significance and economic contribution of emergent Online Communities. These communities have become the new techniques and means of strengthening the efforts of faculty. These communities tend to be fluid and their association often cuts across organizational boundaries and may include members from outside the organization (Davis et al., 2005).

This involves KM tools catering to explicit and tacit knowledge. Exchange Visits and Expert Interviews offer the participants to have a powerful, engaging alternative to interact with intellectuals, learn from them and co-create new knowledge. This was not possible in traditional ways of learning from peers and experts.

The lesser utilized tools are Buzz Groups, Fishbowl, Knowledge Maps, Meeting Facilitation, Real-Time Meeting Evaluation Tools, Ritual Dissent, Timeline, VIPP Card Collection and Clustering, and Webinar (refer Figure 4). This could be the experience of the public universities where there is less receptiveness to open sharing and participation. This also demands some focus from the top management generally dependent upon the head of the department. During the discussions, it was considered that public universities do not have the ecosystem for open knowledge sharing and productive criticism. Receptivity to knowledge sharing could be possible in a few departments but the same spirit is not reflected across the university. The results are comparable in both the universities as the faculty have the same understanding of the KM tools.

Figure 4. Lesser used knowledge management tools (faculty)



Administrators

In the university framework, faculty also work as administrators at multiple profiles. To avoid redundancy, administrators were questioned about the strategical tools only. Out of the five tools, three tools which are used extensively are Balanced Scorecard (BSC), Good Practices and Knowledge Audits. As the universities are evaluated on the basis of other criteria than the financial position only, this observation seems to be valid. Strategic planning process had to address the challenges and also help the organization achieve its objectives (Chopra et al., 2017). Universities are appraised on the basis of other parameters like learning and growth, internal processes perspective and the perception of the stakeholders. Balanced Scorecard has got more than 60% applicability in both the universities.

As the collaborations are high, the flow of Good Practices is also constant in the university setting (refer Table 4). The administrators apply these Good Practices as the benchmark for their respective universities. Good Practices is also practiced extensively as faculty as an administrator, they follow the best practices employed by other universities. Also, Knowledge Audit which is a mechanism to examine where an organization stands in terms of KM and its knowledge assets; the administration keeps gauging the knowledge assets of a university in terms of its

Table 4. Application of strategic knowledge management tools (administrators)

Name of the Tool	All the time		Extensively		Moderately		Neutral		Rarely		Never		Can't say	
	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU	University of Delhi	DTU
1 Balanced scorecard (BSC)	18	19	22	24	21	19	11	16	10	8	9	11	9	3
2 Good Practices	18	17	18	21	22	24	18	12	10	6	8	7	6	13
3 Knowledge Audits	14	17	16	14	21	21	9	12	12	15	18	17	10	4
4 Stakeholder Analysis and Mapping	9	8	16	14	20	21	12	11	11	8	20	24	12	14
5 SWOT	9	8	15	16	17	21	13	18	15	14	19	15	12	8

research output, patents, projects and other performance criteria. The administrators don't use Stakeholder Analysis and Mapping and SWOT significantly. The reasons cited are technological infrastructure, discord among the stakeholders, inadequate training and additional guidance of the personnel. Delhi Technological University has initiated the implementation of an Enterprise Resource Planning program to contain this predicament.

APPLICATION OF KNOWLEDGE MANAGEMENT TOOLS IN THE UNIVERSITY SETTING

The top tools used by students are WhatsApp and YouTube. This clearly implies the way millennials are learning today. There is no parting of academia and leisure for them. They prefer to have a blended platform where learning and recreation go simultaneously. Wikis and Quora are the collective platforms without any separation of the learner and the instructor. This peer learning where synergy plays an important role in defying the boundaries of pupil and mentor. These tools don't require approvals; are informal and require basic infrastructure. The moderate cost of mobile phones and affordable data plans have expedited the pace of adoption of these tools.

Similarly, KM tools promoting learning from peers and mentors taken the centre stage. The community is exploring innovative models of acquiring knowledge

Figure 5. Popular ICT and knowledge management tools (category-wise)

Process/Tools	Students	Faculty	Administrators
ICT Tools	Quora, Wikis, WhatsApp, YouTube	eBooks, Research Gate, Wikis, WhatsApp and YouTube	Same as faculty
Developing and improving a shared practice or area of work	Knowledge Fair, Storytelling	Online Communities, Storytelling	Same as faculty
Learning and sharing lessons within groups	Book Groups, E discussion, Web 2.0	-----	Same as faculty
Learning before, during and after a project/ initiative	Action Action, Forums, Teams, Learning, Subnets	Online Communities, Surveys	Same as faculty
Learning from experts	Book Groups, Expert Interviews, Lightning Talk, Mentoring	Expert Interviews, Mentoring	Same as faculty
Locating expertise and experts	Knowledge Maps, Follow Pages	Knowledge network, Follow Pages	Same as faculty
Building effective in-person knowledge events	Subnetters	-----	Same as faculty
Stimulating creativity, generating new ideas	Brainstorming, Book Groups, Exchange Ideas, WorldCafe	Brainstorming, Exchange Ideas	Same as faculty
Strategical tools	Good Practices	Good Practices	Balanced Scorecard (BSC), Good Practices, Knowledge Audits
Organizational learning	-----	Focused Groups	Same as faculty

in groups. This includes After Action Review, Brainstorming, Buzz Groups, E-discussion, Exchange Visits, Expert Interview, Good Practices, Icebreakers, Knowledge Fair, Knowledge Maps, Lightning Talk, Mentoring and World Café' (refer Figure 5). Commonly, the participants practice these tools virtually where there is no confinement of physical proximity. The ICT tools have taken over the condition where the participants have to be there in the same location. This innovation has enhanced the exchanges and interplays among the participants manifold. The KM tools involving learning from peers, experts for creating new ideas are very prevalent among the learners. The lessons learned before, during and after a project are also important for the students' community. Locating experts in new research areas is also a priority for students as they are curious and crave to have expertise in contemporary domains.

WhatsApp is likewise the most practiced tool for faculty. The new age faculty is also shifting towards tools like eBooks, Research Gate, Wikis and YouTube. The reasons are identical. These tools require no prior approval, are easily available and require no additional infrastructure besides a smartphone and internet connection. The efficiency and ease of these tools have added immense possibilities for content development, research and aiding consultancy projects. Brainstorming, Exchange Visits, Expert Interview, Focus Groups, Good Practices, Knowledge network, Mentoring, Online Communities, Storytelling, Surveys and Yellow Pages are the chosen KM tools of faculty. These tools with the help of ICT tools help the participants to codify, transfer, disseminate and create new knowledge. Now the participants are part of multiple Online Communities serving in diverse capacities creating a virtual world of seamless learning. This has also accentuated that members join the congenial communities having the same aspirations ignoring the physical environment of their own respective departments.

It is unusual to know that students are more open to KM tools than the faculty. It is strengthened in the research that acquiring knowledge within groups and in-person knowledge events are not in the priority of trainers. Public universities are less receptive to open knowledge sharing and productive criticism. The responsiveness is not identical throughout the university. It fluctuates from department to department subject to the head and members. This is also influenced by the head of the institution. The practice of open knowledge sharing is complex to execute than assuming.

The tools which are used by administrators are Balanced scorecard (BSC), Good Practices and Knowledge Audits pinpointing the need for inclusive assessment tools, learning from peers and having the correct estimate of knowledge assets of the university. The technological infrastructure has a tremendous potential in the strategy of the university. KM will not be effective by one person's efforts or by the initiative of one department. It must be made an integral part at all the levels. The strategy requires combined efforts of all the stakeholders in the university

context which can't be handled by the simple ICT tools mentioned in the chapter. The coordination requires commitment and specialized tools like ERP to sustain the competition.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

There are certain limitations of Knowledge Exchange Toolbox including finding ways to capture and record business knowledge efficiently. Also, one solution fit for all is not feasible. The tools are generalized requiring customization, keeping situations and stakeholders in mind. Moreover, knowledge sharing sessions where face-to-face meetings are required, can't be replaced with virtual platforms. The dynamics of learning in a group at the same physical location is the key to success.

Instead of new methods, KM should be implemented into existing processes. The starting point is to manifest clear objectives defining the scope of KM initiatives supported by processes to capture, record and share business knowledge.

The universities can prosper where the knowledge is based on engagement with the world through action, experimentation, and experience (Nonaka and Takeuchi, 1995). The knowledge which is created during the interactions among the participants, is the real knowledge, rendering an edge over the competition. The findings of this research can be compared with research studies in other parts of the world. Also, the outcomes could be compared with private universities.

This research is a unique research which can be the ground for prospective research areas in terms of dynamism of KM tools, ICT tools, or the nine categories of KM i.e. Stimulating creativity, generating new ideas, Learning and sharing lessons within groups, Learning from experts, Learning before, during and after a project/initiative, Developing and improving a shared practice or area of work, Running effective in-person knowledge events, Locating expertise and experts, Strategical tools and Organizational learning. In light of the changing paradigm of learning, the study can pave a way for the evolving needs of new age learners. This could facilitate in designing new courses and the pedagogy for delivering the content. The results highlight how students and faculty are learning, exchanging knowledge and researching. The universities can use the findings to create a platform for enhanced interaction for increased intellectual capital.

CONCLUSION

There is an emerging accord that the most powerful source of sustainable competitive advantage in this intensely competitive business context is knowledge. Today's

digital economy requires a shift from the focus on products to intellectual capital. The ability to outperform the marketplace rested on the continuous generation of intellectual capital, “generation and synthesis of collective, and organizational knowledge” (Brown & Duguid, 1998).

The chapter is an endeavour to understand the knowledge and the KM tools for sharing, transferring, disseminating and creating new knowledge in the context of a university from both epistemological and realistic viewpoints. The role of ICT enabled tools are equally important in assisting KM tools that are critical in managing knowledge. The chapter intends university as knowledge producing, sharing, and disseminating entity where the precise focus is on KM and ICT tools for creating, sharing, utilizing and co-creating knowledge. These tools are the focus of this chapter through the process of an academic inquiry and its implications in the context of public universities in India. Special recognition has been given to the challenges and possibilities of knowledge creation, sharing and disseminating within and beyond the universities. The emerging KM model considers the synthesis of former experiences with future expertise. Knowledge required and created thereof is deemed as a resource to be captured, codified, archived, transferred, and disseminated, i.e. as currency (dePaula & Fischer, 2005).

This chapter described the significance of ICT and KM tools in public universities with the help of two public universities in India. Higher education is a knowledge business and knowledge creation, and dissemination is the core of it (Rowley, 2000). Keeping this theme in mind, this is novel research in recognizing the application of ICT and KM tools in a university. The focus is on academic research and important managerial implications in contemporary universities. The author has identified the tools from a comprehensive investigation which has not been done in the university setting. The application and practice of these tools are assessed from an interdisciplinary perspective highlighting the organizational learning and its implications for KM. The determination of the KM tools for testing was based on the literature review, discussions with the experts and their applicability in the universities. The initial list of 60 KM tools was tested and finally, 46 KM tools and 12 ICT tools were selected after thorough discussions with the stakeholders followed by a pilot study. There are nine categories of KM tools and some tools are common depending upon their usage.

The author has outlined ICT tools acting as an enabler for effective KM. The ICT tools like WhatsApp, YouTube, Wikis and Quora and KM tools like After Action Review, Brainstorming, Buzz Groups, E-discussion, Exchange Visits, Expert Interview, Good Practices, Icebreakers, Knowledge Fair, Knowledge Maps, Lightning Talk, Mentoring and World Café’ have a substantial influence on learning traditions in a university. With the help of these tools, a conducive environment could be created for collaborative and interactive learning. The significant usage of these tools is in

the form of alliances among the participants. These tools are providing students and faculty better learning experience and collective intelligence.

This is also pertinent to note that faculty have indicated the need for formal practice of these KM tools that could serve the backbone of the knowledge sharing culture in the universities. The faculty also highlighted the importance of the KM tools which can be strategic for the universities in order to conceive, create and maintain a knowledge base. The synergy is the guiding force for an uninterrupted knowledge sharing making learning more interactive, enlightening and ubiquitous. Such integration of emerging technologies with teaching methods paves the way for the knowledge society that is characterized by superior academic performance, enhanced learning and innovation. (Gupta & Jain, 2017).

Outlining the role of ICT and KM tools in HEIs is a complex and time-consuming process, because of its extent and fragmented nature. This chapter has reviewed the role and applicability of these tools in detail. As the literature is limited in this area, this study can have future implications on the usage of these tools in public universities. Moreover, the impact could also be assessed in private universities. The synthesis of such tools is paving a way for fundamental change in learning in universities which is a shift from physical to a virtual world. Also, the learning is not confined to the university boundaries but it can span over multiple universities depending upon the participant's network.

The absence of expertise in a particular area is contained by the usage of ICT tools which can remove the geographical boundaries linking like-minded people for collective intelligence. The results can have an enormous influence on the contents, structure, pedagogy and communication in HEIs worldwide. The chapter is an attempt to incorporate the findings in an orderly way for the use of HEIs, management, government, policymakers and other stakeholders having an interest in this domain.

With the advancement of the millennia, growing interest and progress in the domain of ICT and KM have been making strides in all the industries. Development and awareness in these areas have led to free flow and boundless knowledge sharing not only in business organizations but in public universities also. The debut of WhatsApp, YouTube, Wikis and other such ICT tools have enabled the various stakeholders to connect 24*7 irrespective of the location. The involvement of these tools in the HEIs is a tenable opportunity because of its simplicity, easy availability and socio-connective nature. These platforms have become a virtual classroom, in a way, promoting group learning and social-skill building. These multimedia tools have not only intensified knowledge sharing and dissemination but also intensified the learning experience of the users.

The study investigated a wide range of KM tools building an integrated KM system providing a base for knowledge transfer, dissemination and creation. The

results present practical outcomes which are accessible, simple and feasible to implement providing effectiveness in the efforts.

KM is an innovative tool that assists the various stakeholders in a university in knowledge conception; active decision making (Lyons et al., 2008) and intensifying university's performance. It helps to have seamless learning through continuous interaction and dialogue leading to a learning system (Nonaka & Takeuchi, 2004). Public universities in HEIs can have larger knowledge sharing, higher intellectual capital, improved placements, quality research, enhanced strategy implementation and better rankings by using the tools. These tools can lead to developing an ecosystem for knowledge-based society within the university for a higher level of competence. The institutions must make available key academic and collaborative technologies to facilitate the further enhancement of knowledge (Jain & Gupta, 2019).

REFERENCES

- Aharony, N. (2008). Web 2.0 in Schools of Library and Information Science in the USA: Are we missing the boat? *Ariadne*, 54.
- Andreeva, T., & Kianto, A. (2012). Does knowledge management really matter? Linking knowledge management practices, competitiveness and economic performance. *Journal of Knowledge Management*, 16(4), 617–636. doi:10.1108/13673271211246185
- Aranganathan, P., & Lakshmi, J. (2010). *Knowledge management in Indian information technology (IT) organizations in teaching jobs*. Available at: www.indianmba.com/Faculty_Column/FC1137/fc1137.html
- Arivananthan, M. (2015). *Knowledge Exchange Toolbox Group methods for sharing, discovery and co-creation*. Knowledge Exchange Unit, in the Policy, Strategy and Networks Section, in UNICEF's Division of Data, Research and Policy (DRP).
- Bigliardi, B., Galati, F., & Petroni, A. (2014). How to effectively manage knowledge in the construction industry. *Measuring Business Excellence*, 18(3), 57–72. doi:10.1108/MBE-10-2013-0055
- Bower, M., Woo, K., Roberts, M., & Watters, P. (2006). *Wiki pedagogy- a tale of two wikis*. Ultimo: Information Technology Based Higher Education and Training. doi:10.1109/ITHET.2006.339764
- Brown, J. S., & Duguid, P. (1998, September). 'Invention, innovation & organization'. *Organization Science*, 1–36.

Choi, S. Y., Lee, H., & Yoo, Y. (2010). The impact of information technology and transactive memory systems on knowledge sharing, application, and team performance: A field study. *Management Information Systems Quarterly*, 34(4), 855–870. doi:10.2307/25750708

Chopra, M., Gupta, V., & Chhabra, B. (2017). Strategic Management Using Balanced Scorecard—A Case Study on Tata Power. *South Asian Journal of Business and Management Cases*, 6(2), 176–190. doi:10.1177/2277977917730446

Choy, S. O., & Ng, K. C. (2007). Implementing wiki software for supplementing online learning. *Australasian Journal of Educational Technology*, 23(2). doi:10.14742/ajet.1265

Correspondent, S. (2014, June 6). *Pranab envisages varsity as breeding ground of creativity*. Retrieved June 11, 2019, from <https://www.thehindu.com/news/cities/kolkata/pranab-envisages-varsity-as-breeding-ground-of-creativity/article6088529.ece>

Davis, J., Subrahmanian, E., & Westerberg, A. (2005). Knowledge Management: Conceptual Foundations, Emerging Directions. In J. Davis, E. Subrahmanian, & A. Westerberg (Eds.), *Knowledge Management*. Physica-Verlag HD. doi:10.1007/3-7908-1618-3_1

dePaula, R., & Fischer, G. (2005). Knowledge Management: Why learning from the past is not enough! In J. Davis, E. Subrahmanian & A. Westerberg (Eds.), *Knowledge Management: Organizational and Technological Dimensions* (pp. 21-54). New York: Physica-Verlag Heidelberg.

Donne, V. (2012). Wiki: Using the web connections to connect students. *TechTrends*, 56(2), 31–36. doi:10.1007/11528-012-0561-9

Duhon, B. (1998). It's all in our heads. *Inform (Silver Spring, Md.)*, 12(8), 8–13.

Elgort, I. (2007). Using wikis as a learning tool in higher education. *ICT: Providing Choices for Learners and Learning, Proceedings ASCILITE Singapore*, 233-238.

Friehs, B. (2003). *Knowledge Management in Educational Settings*. In AARE/NZARE Conference on Educational Research, Risks & Dilemmas. Auckland, New Zealand.

Goddard, A. (1998). Facing up to market forces. *Times Educational Supplement*, 13, 6–7.

Understanding the Dynamics of Knowledge Management Tools in Two Public Universities

Gupta, V., & Chopra, M. (2018). Gauging the impact of knowledge management practices on organizational performance – a balanced scorecard perspective. *VINE Journal of Information and Knowledge Management Systems*, 48(1), 21–46. doi:10.1108/VJKMS-07-2016-0038

Gupta, V., & Jain, N. (2017). Harnessing information and communication technologies for effective knowledge creation: Shaping the future of education. *Journal of Enterprise Information Management*, 30(5), 831–855. doi:10.1108/JEIM-10-2016-0173

Higher Education in India: Vision 2030. (2013). *FICCI Higher Education Summit 2013*. EY and FICCI.

Jain, N., & Gupta, V. (2019). The impact of knowledge management system on student performance: A case study of the University of Delhi. *VINE Journal of Information and Knowledge Management Systems*, 49(1), 115–135. doi:10.1108/VJKMS-07-2018-0065

Jandaghi, G., Irani, H. R., Sadat, M. Z., & Maryam, D. (2014). Ranking the Knowledge Management Enablers Based on University Academic Members, Staff and Students Using AHP Method. *International Letters of Social and Humanistic Sciences*, 26, 7–13. doi:10.18052/www.scipress.com/ILSHS.26.7

Lee, D. Y., & Lehto, M. R. (2013). User acceptance of YouTube for procedural learning: An extension of the technology acceptance model. *Computers & Education*, 61, 193–208. doi:10.1016/j.compedu.2012.10.001

Losh, E. (2011). YouTube pedagogy finding communities of practice in a distributed learning world. *Learning through Digital Media Experiments in Technology and Pedagogy*.

Lyons, Acsente, D., & van Waesberghe, M. (2008). Integrating knowledge management and quality management to sustain knowledge enabled excellence in performance. *Vine*, 38(2), 241–253. doi:10.1108/03055720810889879

Mertins, K., Heisig, P., & Vorbeck, J. (2001). *Knowledge Management: Best Practices in Europe*. Springer. doi:10.1007/978-3-662-04466-7

MHRD. (2016). *About Department of Higher Education*. Retrieved from mhrd.gov.in/overview

MHRD. (2018). *All India Survey on Higher Education 2017-18*. Department of Higher Education, Ministry of Human Resource Development, Government of India, New Delhi. Retrieved as on 24.5.2019 from https://mhrd.gov.in/sites/upload_files/mhrd/files/statistics-new/AISHE2017-18.pdf

- Miozzo, M., Desyllas, P., Lee, H. F., & Miles, I. (2016). Innovation collaboration and appropriability by knowledge-intensive business services firms. *Research Policy*, 45(7), 1337–1351. doi:10.1016/j.respol.2016.03.018
- Nonaka, I. (1991). The knowledge-creating company. *Harvard Business Review*, 69, 96–104.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14–37. doi:10.1287/orsc.5.1.14
- Nonaka, I., & Takeuchi, H. (1995). *The Knowledge Creating Company*. Oxford University Press.
- Nonaka, I., & Takeuchi, H. (2004). Theory of organizational knowledge creation. In Hitotsubashi on Knowledge Management. John Wiley & Sons (Asia) Pte Ltd.
- Orús, C., Barlés, M. J., Belanche, D., Casaló, L., Fraj, E., & Gurrea, R. (2016). The effects of learner generated videos for YouTube on learning outcomes and satisfaction. *Computers & Education*, 95, 254–269. doi:10.1016/j.compedu.2016.01.007
- Park, J. C. (2009). Video allows young scientists new ways to be seen. *Learning and Leading with Technology*, 36(8), 34–35.
- Pérez-Lopez, S., & Alegre, J. (2012). Information technology competency, knowledge processes and firm performance. *Industrial Management & Data Systems*, 112(4), 644–662. doi:10.1108/02635571211225521
- Petrides, L.A., & Nodine, T.R. (2003). *Knowledge Management in Education: Defining the Landscape*. Institute for the Study of Knowledge Management in Education, Half Moon Bay.
- Polanyi, M. (1967). *The Tacit Knowledge Dimension*. London: Routledge & Kegan Paul.
- Ramalingam, B. (2006). *Tools for knowledge and learning: A guide for development and humanitarian organisations*. London: Overseas Development Institute.
- Rašula, J., Vukšić, V. B., & Štemberger, M. I. (2012). The impact of knowledge management on organizational performance. *Economic and Business Review*, 14(2), 147–168.
- Reddy, A. (2019, February 28). *India's Higher Education Needs a Paradigm Shift*. Retrieved May 24, 2019, from <https://thewire.in/education/indias-higher-education-needs-a-paradigm-shift>

Understanding the Dynamics of Knowledge Management Tools in Two Public Universities

Regulatory Structure of Higher Education in India; Centre for Civil Society Submitted to International Growth Centre. (2015, February). Retrieved from <https://ccs.in/sites/default/files/research/policy-brief-regulatory-structure-higher-education.pdf>

Rowley, J. (2000). Is higher education ready for knowledge management? *International Journal of Educational Management*, 14(7), 325–333. doi:10.1108/09513540010378978

Sethi, N. (2017). *India's demographic dividend to peak by 2020: economic Survey*. *Business Standard*. Available at: www.business-standard.com/budget/article/india-s-demographic-dividend-to-peak-by-2020-economic-survey-117013101013_1.html

Sinha, N., Kakkar, N. K., & Gupta, V. (2009). Unleash the power of creativity and innovation. *International Journal of Sustainable Strategic Management*, 1(4), 417–433. doi:10.1504/IJSSM.2009.030515

Sinha, N., Kakkar, N. K., & Gupta, V. (2012). Uncovering the secrets of the twenty-first-century organisation. *Global Business and Organizational Excellence*, 31(2), 49–56. doi:10.1002/joe.21414

Sinha, N., Kakkar, N. K., & Gupta, V. (2015). Harnessing the power of knowledge management for innovation. *International Journal of Knowledge and Learning*, 10(2), 124–146. doi:10.1504/IJKL.2015.071623

Sulaiman, F., Ramayah, T., & Omar, A. (2010). *ICT Security Policy in a Higher Education Institution in Malaysia*. In *Handbook of Research on Information Communication Technology Policy: Trends, Issues and Advancements: Trends, Issues and Advancements* (p. 354). Hershey, PA: Information Science Reference.

Trifonova, A., & Ronchetti, M. (2006). Hoarding content for mobile learning. *International Journal of Mobile Communications*, 4(4), 459–47. doi:10.1504/IJMC.2006.008952


White, J. W. (2009). Coffy, YouTube, and uncle ben: The use of film and new media in the teaching of African American studies at the university of Hawaii. *New Media in Higher Education*, 42(1/2), 47–53.

Yadav, R., Tiruwa, A., & Suri, P. K. (2017). Internet based learning (IBL) in higher education: A literature review. *Journal of International Education in Business*, 10(2), 102–129. doi:10.1108/JIEB-10-2016-0035

Chapter 8

Practices and Challenges of Knowledge Management in the Greek Public Sector

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ABSTRACT

Knowledge management (KM) is a highly appreciated initiative in the field of management, and though it was initiated from the private sector, in the last years there has been an extensive interest and concern in the public sector. KM seems to be an excellent solution in order to manage the information and knowledge inside the organizations by saving valuable resources. In this research, many studies concerning the implementation of different KM practices in Greek organizations were examined. From the studies analyzed, it was concluded that the employees of the Greek public organizations have embraced all the activities concerning KM practices. However, many problems typical of the Greek public sector were present such as the absence of a reward system for knowledge transfer, the functioning of the public sector employees in an individualistic way, and the delay in adopting information and communication technology (ICT) practices and in the promotion of e-government.

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INTRODUCTION

Knowledge management (KM) is a highly appreciated initiative in the field of management and though it was initiated from the private sector, in the last years there is an extensive interest and concern in the public sector. Public sector, having as a main scope to provide quality services could exploit KM, in order to be more effective and productive. However, the public sector presents issues (like bureaucracy and other structural problems) that establish KM's implementation even more demanding, essential and being capable to solve many problems.

Greek public sector presents not only the main problems of public management, but in addition, it confronts a long-lasting economic crisis, existing in the country. This crisis raises tough barriers, as the budgets and the funding of organizations are always decreasing. KM seems to be an excellent solution to manage the information and knowledge inside the organizations by saving valuable resources. Many organizations have realized the potential of KM and have already made attempts to facilitate its implementation.

In this research, many studies concerning the implementation of different KM practices in Greek organizations were examined and the more important conclusions were presented. As already referenced, Greek public organizations present the last years an increased interest in KM and therefore there were many case studies. Despite the number of studies already conducted in the public, it still seems that the subject needs to be further investigated.

This study is an attempt to provide some insights into KM practices behavior of public sector employees in a developed, but rather a problematic state and economy, such as the Greek one.

More specifically, the objective of this study is to register the situation in the Greek public sector towards KM practices and activities as:

- The general perception about KM.
- Motives to encourage knowledge sharing.
- Human resources in KM practices.
- Learning in practice and Learning organization.
- Level of ICT implementation.

BACKGROUND

KM in the Public Sector

KM is an initiative that managed to enter into the management field in the last decades. Nonaka & Takeuchi (1995) have formed the principles and perspectives of business knowledge and signaled the beginning of exploiting knowledge in the organizational level. First of all, they defined KM as an activity, which includes the abilities and experiences of the organizations' members, the innovation and creativity potential, the optimal business practices, the patents, the knowledge that the organizations have accumulated for the market and its customers, as well the knowledge for its competitors. They also highlighted that business knowledge is not only the total of its members' knowledge, but the modern business environment demands the full exploitation of the collective business knowledge of a company. Lastly, they reported that the creation of organizational knowledge is the ability of an organization as an entity, to create new knowledge and to disseminate it inside the organization and to integrate it into products, services, and systems.

The extended spreading of information in the last decade of the 20th century and at the beginning of the 21st has made the world a very small place. The evolution in communication technologies and the internet have entered into every aspect of human life. As the world had become and still has, smaller and easily accessible from many people, information and knowledge are expanding at an even bigger pace. Knowledge is now globally accepted as a driving force of economic development and a powerful factor of social relationships' configuration (Geisler, 2008). Many private and public organizations are now eligible, due to this technological evolution, to codify, to store and to process enormous quantities of information and data, originated from the registration of their internal processes, as from the observation and study of their external (direct and not) environment. Drucker (1993) have precluded the arrival of a new economy and society, calling it «knowledge society» (herald the arrival of a new economy or society, referred as “Knowledge society”).

From the above mentioned it can be deduced that knowledge is considered a valuable intangible resource, which can be decisive for the sustainability of the organizations. One of the management gurus, Drucker (1995) pointed out that knowledge is an important economic resource in an organization. KM was originated and used in the private sector, however, in the last years its utilization is considered essential for the public sector as well. Many of its aspects are yet to be explored and especially public sector can be benefited additionally from its implementation.

As Arora (2011) presented, many tendencies have affected the actions of public organizations and led them to the exploitation of knowledge. These tendencies include the globalization of economies and societies, usage of market methods from public

organizations, continuous and rapid changes in technology and science, the urgent need to secure peoples' well-being, the deficiency in public resources.

At the same time, the implementation of KM in the public sector must confront some serious challenges (OECD, 2003) as citizens are more demanding since as clients they receive services from the private sector too, human resources have reduced, and HRM is not effective.

The public sector serves an important role, as a factor to retain and improve the economy and citizens' quality of life. These reasons have triggered the interest of public sector organizations in knowledge. More specifically KM can deal with some important problems of public management (Theocharis & Tsihrintzis, 2016) as the following:

- When there is a need for specific expertise or skill and none of the existing staff seems to have the appropriate knowledge.
- When a solution to a problem requires some experience, but the person who has this experience is missing.
- When the matching of the person (meaning its abilities) and the job does not work efficiently while optimal matching between position and specific, objective abilities.
- When an organization decides to apply the policies of staff training, but training needs, which reflect specific knowledge gaps are not known and have not been documented.
- When there is knowledge to certain individuals, however, either is not used or not effectively diffused the Organization for a variety of reasons.

Although the application of knowledge management varies greatly between organizations in the public and the private sector, the value of knowledge management can generally be found in the following areas (Theocharis & Tsihrintzis, 2016):

- **Decision Making:** With the contribution of knowledge management the organization can achieve better and faster decisions because the experience of the organization is already recorded.
- **Autonomy Resources:** The involved employees become able to access and use the knowledge of their peers while enhancing their responsibility and control of their performance.
- **Learning:** More rapid learning by compressing the length of the learning curve for any new object assigned to employees.

The Role of ICT

One more factor that contributes to the recognition of the value of knowledge and its management, is the rapid technological evolution. In the field of information and communication, in particular, the evolution is abrupt and all the organizations should be adapted in the recent era, which is frequently called as information or knowledge era one. ICT can provide KM the essential tools to support most of its procedures. The technology can be used as a mean of conception, storage, and dissemination of knowledge (Syed-Ikhsan & Rowland, 2004a). Hence, the information that exists in the local, regional or national level, can be exploited appropriately in order to improve the quality of services provided to the citizens. The technology used in the field of knowledge has been considered one of the decisive factors to create KM (Davenport & Prusak, 2000) and furthermore, many organizations consider the procedure of KM, as the equivalent of technological infrastructure provision (Yayha, 2009).

With the outbreak of digital connectivity, government organizations all over the world, implement ICT applications to increase their productivity, to improve accountability and to facilitate the reform of the public sector. The appropriate implementation of KM is essential to government organizations that function in the local, regional or national level because government organizations are based on a greater level to knowledge. KM has already become a practice integrated in e-Government programs of many countries (Yuen, 2007).

Greek Public Sector and the Need for Reform

The Greek public sector seems to present many and severe inefficiencies and malfunctions. First of all, as a government-oriented one, its decisions and actions are based on specific legislation and hence the bureaucracy is a major disadvantage. Many attempts to reform the public sector have been introduced from Greek governments in the last years, as OPIS (a special operation program in Information Systems), Kallikratis (a reform concerning local government), KEP (state institutions which provide specific public services), Taxis system (a taxation Information System). Moreover, there is an overall effort to diffuse and enhance e-Government all over the public sector.

Another important problematic issue in the Greek public sector is the strategy concerning human resource management (HRM). All the employees get paid the same salary (regardless of their productivity), no evaluation exists, transfers and mobility of staff are difficult to be realized, and dismissals are prohibited from the constitution of the country. All the above issues, establish a structure that is difficult to operate functionally and to be flexible.

The economic crisis is another important issue that affects the public sector's functioning. The need to cut down budgets is rising and all government agencies choose as their first priority to reduce their expenses. This way, investments in the basic elements of KM as education, training, and technology are hardly supported.

However and despite the repeated reforms, the Greek public sector continues to underperform. For example, regarding the e-administration, Greece remains in the 35th place in the United Nations' e-Government Readiness Index (United Nations, 2018). In general, it seems that the Greek public sector needs many more steps and efforts to be modernized.

MAIN FOCUS OF THE CHAPTER

Main Concern of the Study

The main concern of the present research was to evaluate the situation of KM practices in Greek public organizations, but only in the last ten years, since evolution and development are rapid and continuous in the subject examined. Hence, the studies concentrated, concerned mainly the Greek public sector and presented different KM activities (as KM practices, Knowledge transfer, Knowledge diffusion, and others) in Greek public sector organizations. However, many other studies with similar issues from the international environment were also referenced (see Table 1, Appendix).

The studies for Greek public sector organizations reported in this research, as already mentioned, were all conducted in the last decade. Another characteristic was that most of them were post-graduate theses of a specific university and department. The Department of Business Administration at the University of Macedonia (Thessaloniki, Greece) has introduced many post-graduate programs in the field of management. The students attending these programs have produced many types of research and plenty of them concerned the public sector, as the proportion of public employees in these programs was high.

KM Aspects Examined

General Attitude Towards KM

In the study of Protidou (2019), questioning employees from OAED (the organization for employment in Greece), it was deduced that the staff has fully realized the benefits from the exploitation of knowledge and with the contribution of organization's administration, has already used many KM techniques. Employees of the organization

also declared that they were available and eager to contribute to knowledge acquisition and knowledge sharing activities.

In a study from Papaioannou (2018), it was also deduced that employees realize and acknowledge the importance of knowledge as the main instrument, which contributes to productivity and efficiency of their work. Matapa (2017) examined KM aspects in a public hospital and concluded that the leadership recognizes the importance of knowledge and its potentiality to provide a competitive advantage.

In the study of Sandhu, Kishore & Umi (2011) in a Malaysian public organization, the majority of employees considered the knowledge and its sharing very important assets. In the study of Henntonon, Kianto & Ritala (2016) in a Finnish organization, most of the employees were favorably disposed towards knowledge and knowledge sharing.

In general, most of the employees in public organizations displayed a positive attitude toward KM and its respective activities, as they realize that they can be benefited from them.

Motives for Knowledge Transfer

In the study of Tsagkalidou (2011), it was realized that the organization examined, neither encourage nor gives the appropriate motives to the employees. In the same study it was also referenced that team learning and cooperation are encouraged, but in an informal way and without a system and furthermore team successes are not rewarded. In the work of Stambellos (2018), most employees reported that they wish their organization would implement a system of motives/rewards, which remunerates employees that transfer and share their knowledge.

The overall conclusion is that employees in the Greek public sector are not encouraged with motives and rewards for actions concerning knowledge transfer. As referenced, there is no reward system for the employees in the Greek public sector and hence their performance and productivity is not evaluated for any of its actions.

Human Resource Exploitation

Another important subject in the Greek public sector is the placement of public servants in their positions and their appropriate exploitation, which seems not to be conducted in an organized and justified manner.

The first example concerns employees from OAED in the study of Protidou (2019), in which members of the staff considered that they were not positioned in the appropriate position, in relation to their qualifications, skills, and experience. A similar result was evident in the study of Triglinaou (2018), where employees were dissatisfied from their positioning in their current positions, as they believed

this placement did not match their skills, interests, and experiences. The employees questioned in the study of Papaioannou (2018), expressed the view that their training and experience remained unexploited and they stated complaints about the selection and staffing inside their organization.

On the contrary, in the study of Syed-Ikhsan & Rowland (2004b) in the Malaysian public sector, employees were positioned accordingly to their experience, interests, and qualifications and expressed their satisfaction.

Learning in Practice/ Learning Organization

Another aspect of knowledge and KM is the way that employees learn in their everyday work practice. In the studies of Protidou (2019) and Grammatikou (2018), it was presented that KM becomes perceivable in an individual and not organizational (or holistic) level. Stambellos (2018) states that people in the organization examined, learn more frequently in practice.

Despite the individual functioning of employees presented above, the result of the questionnaires in the employees of OAED displayed that their organization is becoming a learning organization. On the contrary, in the studies of Cheili (2012) and Stavrakidou (2011) the organizations examined (hospital, Directorates of an insurance organization) could not be characterized as learning organizations.

Management/Administration's Commitment

In the studies of Grammatikou (2018), Triglinaou (2018), and Papaioannou (2018) it was deduced that the lack of commitment from the administration of the organization, remains a major problem. Karamanavi (2018) in a theoretical review of literature, comes to the conclusion that a common framework for knowledge actions and practices does not exist, despite the intense interest of Greek public organizations.

Trivella & Nasiopoulos (2014) in their research conducted in public tertiary education, discovered that many obstacles were present and complicated the implementation of a knowledge strategy in Greek universities. Policies implemented were conservative and the general status allowed no flexibility and practices to manage the existing knowledge were not evident.

ICT

ICT as above mentioned is a valuable asset for many KM practices and hence another subject examined in this study was the level of ICT utilization in Greek public sector organizations. As reported below the results were not satisfactory as

most of the organizations examined did not succeed in establishing a technology-friendly environment.

In the study of Karydi (2010), it was discovered that employees were not familiar with the technology. In another study, author Papaoiannou (2018) stated, that there was no ICT infrastructure in the public organization examined. From the Greek organizations examined, OAED was again the exception, as in the study of Protidou (2019) it was referenced that many ICT tools were utilized, and the percentage of use of these tools was high. The employees of the organization were adapted in the electronic environment which had been established in the organization.

In the study of Syed-Ikhsan & Rowland (2004b), the use of ICT tools was quite high, and it was also evident that the use of these tools encouraged the acquisition of knowledge, although knowledge sharing was not profited.

Person-Centered Approach

Many times knowledge sharing is considered to weaken the position and the power of the employee in the organization (Probst, Raub, & Rombhardt, 2000). Especially in the recent years of economic crisis and working in security, employees are afraid that knowledge sharing can make their position more insecure because employees are uncertain for the issues that can share and they do not know the exact intentions of management (Lelic, 2001). Hence, a reason for the accumulation of knowledge is probably associated with the possible loss of value and power in negotiations and consequently in the competitive advantages of an employee (Husted & Michailova, 2002). In the study of Henntonen et al. (2016), the saying “knowledge is power” was supported, in the sense that the production of specialized knowledge, signals a desirable position in the organization (Cross & Gray, 2013). Another example of hesitation to share knowledge was evident in the study of Sandhu et al., (2011) in a Malaysian organization. In the study of Amaya (2013), personal benefits were negatively associated with the willingness of the staff to share knowledge.

In the study of Grammatikou (2018), a person-centered approach of the employees is evident in knowledge issues, a culture of no-cooperation is concealed and employees have also the sense that they ought to know and dissolve problems on their own. Eventually, it was found that KM is perceivable in an individual and not on an organizational level. Stambellos (2018) in his study reported that the collaboration between employees is extremely restricted.

As a result of all the studies examined KM practices and other relevant aspects in the Greek public sector, it was deduced that most employees in the organizations are learning in practice. This situation occurs because there is no exploitation of existing knowledge. Namely, knowledge is not captured, stored and then communicated to all the interesting parts. However, this is a fact that has also been reported in other

countries, as employees seemed to keep some or the whole knowledge for themselves, for reasons concerning their survival in the tough working environment.

SOLUTIONS AND RECOMMENDATIONS

The process of implementing KM in the public sector presents many problems and some of them were presented above. These problems exist in an organizational and individual level as well. Two studies have concentrated some more of the problems, they are more detailed and they are presented below.

According to Rossidis & Aspridis (2017), the obstacles of KM implementation are concentrated in the below mentioned:

- The effort to transfer strategies from the private sector could be inefficient.
- Intense resistance of the employees to changes.
- Much working time must be spent on training.
- Databases are overloaded and hence they become difficult to manage.

Theocharis & Tsihrintzis (2016) have registered problems that could delay the implementation of KM at an individual level and they are the following:

- Employees gained knowledge which was acquired before the beginning of their professional career or during their employment, but they are not allowed to use it.
- Employees during the execution of their duties are required to possess knowledge, which however they do not communicate to other employees performing the same tasks.
- The suitable person to solve a problem usually exists, yet few know how to find it.
- When employees are invited to solve a problem, they ask and seek knowledge from their colleagues, but usually, they keep this knowledge to themselves.
- Every organization wants to have the best employees, but when they acquire them and train them properly, for various reasons those either change the subject or even organization.
- Employees must document their deliverables fully, but often do not have easy access to the relevant files.

The Greek public sector needs additional and serious efforts to overpass the existing obstacles and specific examples of appropriate actions to be taken are:

- Introduction of ICT depending on the needs and potential of every public body.
- Providing incentives to the employees to ensure participation in knowledge acquisition, and sharing.
- Form a clear vision and mission of every public organization and spread it all over the organization.
- Rewards for productivity and efficiency in the individual and organizational level.
- Creation of KM teams or departments and establishment of KM's responsible.

The Greek public sector also needs to comply with the New Public Management (NPM) concept, which focuses on providing quality services to the citizens, using private sector management models. Many attempts in this direction have been realized, yet the situation in the Greek public sector remains problematic.

FUTURE RESEARCH DIRECTIONS

More thorough studies are acquired to be conducted in other Greek public organizations. Public administration covers a large field of providing services and for example, no study was found in the local government field in Greece. The subject of KM is a rather novice concept for Greek public organizations and they seem not to be eligible to fully understand and implement it.

The penetration of ICT in the provision of public services is still at its infancy in Greece and it is an ongoing process which year after year adds more relevant actions in the tools that public sector organizations own and use. Hence, there is a need for continuous evaluation of the situation concerning the level of ICT penetration in Greek public sector organizations.

The field of KM remains undiscovered at the international level too, and it needs further and thorough examination. It is a subject that will remain "hot" for a long time in the modern management field.

CONCLUSION

It was decided to devote some words to OAED, the Greek public organization that seemed to distinguish from all the others in Greece. OAED is a public organization which seems to be as one of the first organizations in Greece that implements new management practices. A re - engineering model which has been already implemented since the year of 2012, has attributed many innovative characteristics

in the organization, in its processes, and in the employees' mindset. Indeed, in relation to other studies presenting Greek public organizations, it was noticed that OAED and its employees are involved in a process, during which they understand that the utilization and exploitation of knowledge, with the provision of the suitable technological (and not) tools from the administration, can produce many advantages in their work. Finally, it is deduced that inside the organization, a serious effort is realized, which converges in producing benefits for all people involving in these processes. It was also noticed that ICT tools and procedures hold an important position in this process, as they are used extensively by the employees.

As concluded from this research, Greek public sector seems not to be eligible for implementing KM practices, as it presents many issues, needed to be resolved first, in order to have an appropriate introduction of KM. However, in the case of OAED where a management reform was also introduced, it was evident that KM practices are more welcomed from the employees and this organization should be an example for others.

Most of the employees of the Greek public organizations seemed to have embraced all the activities concerning KM practices, as they consider that these actions could improve their everyday work. Hence, the majority of the employees were eager to be involved in KM practices and it is in the hands of the administration to exploit this willingness.

However, many problems typical of the Greek public sector were present. First of all, it was evident that many structural issues exist in the Greek public sector, especially in the management field. One can notice the absence of a reward system for knowledge transfer and sharing and therefore there are no motives to encourage employees in these actions. A second deduction is that public sector employees function in an individualistic way in their everyday work, preferring to solve problems by their own and do not communicate solutions to others. Another characteristic of the Greek public sector is the delay in adopting information and communication technology (ICT) practices and the promotion of E-government.

It was also evident that the situation in the Greek public sector is not exactly the same as in other countries. In some public sector organizations from other countries, the placement of employees was more appropriate, many more ICT tools were utilized and in general, the level of implementation of KM practices was better, in the international level.

Some other characteristics of the Greek public sector were the individualism of the employees in their work, the lack of communication, the individualistic way of solving the problems, and that most of the learning inside the organizations was realized in practice and not with the contribution of other, more formal activities. Employees were not eager to share their knowledge because they wanted to strengthen their position in their organization. However, it must be stated that some of the

above characteristics were also evident in other countries and they are not only a Greek phenomenon.

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REFERENCES

- Amaya, A. T. (2013). Determinants of knowledge sharing in a public sector organization. *Journal of Knowledge Management*, 17(3), 454–471. doi:10.1108/JKM-11-2012-0369
- Arora, E. (2011). Knowledge Management In Public Sector. *Journal of Arts Science and Commerce*, 2(1), 165–171.
- Cheili, E. (2012). *Learning organization: the case of a public organization (OAEE)* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 14735) (in Greek)
- Cross, R., & Gray, P. (2013). Where has the time gone? Addressing collaboration overload in a networked economy. *California Management Review*, 56(1), 50–66. doi:10.1525/cm.2013.56.1.50
- Davenport, T. H., & Prusak, L. (2000). *Working knowledge: How organizations manage what they know*. Boston: Harvard Business School Press.
- Drucker, P. (1993). *Post-capitalist society*. Oxford: Butterworth Heinemann.
- Drucker, P. (1995). *Managing in a time of Great Change*. Truman Talley/E.P. Dutton.
- Geisler, E. (2008). *Knowledge and knowledge systems*. Hershey, PA: IGI Publishing. doi:10.4018/978-1-59904-918-2
- Grammatikou, E. (2018). *Knowledge management as a quality improvement tool in Urban planning services* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 21761) (in Greek)

- Henttonen, K., Kianto, A., & Ritala, P. (2016). Knowledge sharing and individual work performance: An empirical study of a public sector organization. *Journal of Knowledge Management*, 20(4), 749–768. doi:10.1108/JKM-10-2015-0414
- Husted, K., & Michailova, S. (2002). Diagnosing and fighting knowledge-sharing hostility. *Organizational Dynamics*, 31(1), 60–73. doi:10.1016/S0090-2616(02)00072-4
- Karamanavi, V. (2018). *Implementation practices' evaluation of knowledge management in the public sector* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 21828) (in Greek)
- Karydi, A. (2010). *Knowledge management in public sector. The case of General Secretariat of Macedonia Thrace* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 13998) (in Greek)
- Lelic, S. (2001). Creating a knowledge sharing culture. *Knowledge Management*, 4(5), 6–9.
- Matapa, E. (2017). *Knowledge management in nursing services- the case of a public hospital* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 20879) (in Greek)
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.
- OECD. (2003). *Conclusions from the results of the survey of Knowledge Management Practices for Ministries/Departments/Agencies of Central Government in OECD Member Countries*. OECD.
- Papaioannou, C. (2018). *Techniques and tools for dissemination and knowledge exchange, as a mechanism for effectiveness and efficiency in the provision of public service sector services: the case of the directorate of development and environment in the region of Central Macedonia* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 21824) (in Greek)
- Probst, G., Raub, S., & Rombhardt, K. (2000). *Managing Knowledge*. Chichester: John Wiley & Sons.
- Protidou, S. (2019). *Good practices and Knowledge diffusion in OAED* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 22872) (in Greek)
- Rossidis, I., & Aspridis, G. (2017). *Knowledge Management*. Athens: Stamoulis. (in Greek)

Sandhu, M., Kishore, K., & Umi, K. (2011). Knowledge sharing among public sector employees: Evidence from Malaysia. *International Journal of Public Sector Management*, 24(3), 206–226. doi:10.1108/09513551111121347

Stampellos, C. (2018). *Knowledge management in the public sector. Necessity or luxury? The contribution of knowledge management in the functioning of public administration. The case of the North Aegean region* (Master thesis). Available from Hellenicus Institutional Repository. (Identifier 1827) (in Greek)

Stavrakidou, P. (2011). *Learning organizations in the health sector: the case of a hospital*. (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 14847) (in Greek)

Syed-Ikhsan, S., & Rowland, F. (2004b). Benchmarking knowledge management in a public organization in Malaysia. *Benchmarking*, 11(3), 238–266. doi:10.1108/14635770410538745

Syed-Ikhsan, S., & Rowland, R. (2004a). Knowledge management in a public organization: A study on the relationship between organizational elements and the performance of knowledge transfer. *Journal of Knowledge Management*, 8(2), 95–111. doi:10.1108/13673270410529145

Theocharis, S. A., & Tsihrintzis, G. A. (2016). Knowledge Management Systems in the Public Sector: Critical Issues. *Lecture Notes on Software Engineering*, 4(1), 59–65. doi:10.7763/LNSE.2016.V4.224

Triglinaou, E. (2018). *Knowledge management in the public sector: an implementation proposal in judicial services* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 21856) (in Greek)

Trivella, L., & Nasiopoulos, K. D. (2015). Knowledge Management Strategy within Higher Education. The case of Greece. *Procedia - Social and Behavioral Sciences*, 175, 488-495.

Tsagkalidou, S. (2011). *Knowledge management in public administration* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 14243) (in Greek)

United Nations. (2018). *E-Government Survey 2018: Gearing E-Government to Support Transformation towards sustainable and resilient societies*. Retrieved from <https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2018>

Yahya, K. (2009). Power-influence in decision making, competence, and organizational culture in public organizations. *Journal of Public Administration: Research and Theory*, 19(2), 385–408. doi:10.1093/jopart/mun005

Yuen, H. Y. (2007). Overview of Knowledge Management in the Public Sector. *7th Global Forum on Reinventing Government: Workshop on Building Trust in Government*. Retrieved on 16 Dec 2018 from <http://unpan1.un.org/intradoc/groups/public/documents/unpan/unpan026041.pdf>

ADDITIONAL READING

Heffron, F. (1989). *Organization Theory and Public Organizations*. New York, NY: Prentice Hall.

Jain, K. K., Sandhu, M. M., & Sidhu, G. (2007). Knowledge sharing among academic staff: A case study among business schools in Klang Valley, Malaysia. *Journal for the Advancement of Arts and Science*, 2(January), 23–29.

Leydesdorff, L. (2003). The mutual information of university-industry-government relations: An indicator of the Triple Helix dynamics. *Scientometrics*, 58(2), 445–467. doi:10.1023/A:1026253130577

Marsick, V., & Watkins, K. (2003). Demonstrating the value of an organization's learning culture: The dimensions of the learning organizations questionnaire. *Advances in Developing Human Resources*, 5(2), 132–151. doi:10.1177/1523422303005002002

McAdam, R., & Reid, R. (2000). A comparison of public and private sector perceptions and use of knowledge management. *Journal of European Training*, 24(6), 317–329. doi:10.1108/03090590010346424

Pandey, S. K., & Wright, B. E. (2006). Connecting the dots in public management: Political environment, organizational goal ambiguity, and the public manager's role ambiguity. *Journal of Public Administration: Research and Theory*, 16(4), 511–532. doi:10.1093/jopart/muj006

KEY TERMS AND DEFINITIONS

Knowledge: Set of information including experiences, values, context information about specific fields of action in an organization, used to evaluate and incorporate new experiences and information.

Knowledge Management: The process of identifying, creating, sharing, using and managing knowledge and information inside an organization in order to achieve the organization's objectives.

Knowledge Management Practices: Specific methods or initiatives used by the organization to support the creation, transfer, storage, retrieval and application of knowledge, and they can include technical as well as human components.

Knowledge Sharing: Process of transferring or disseminating knowledge from one person to another person or group or unit inside an organization.

Knowledge Transfer: The communication of knowledge between individuals, groups, or organizations with a scope to be absorbed and applied by the recipient.

Learning: The process of teaching or other methods used to acquire knowledge or skills.

Learning Organization: Is an organization that facilitates the learning of its members, in order to learn effectively and enhances organizational performance (or achieve the organization's objectives).

Organizational Learning: The process with which the organization attempts to gain understanding and conceive the nature of knowledge that it is contained within.

APPENDIX

Table 1. Studies about KM examined in this study

Authors & Year	Organizations/ Field	Country	Type	Examined All the Organization	Sample	Total Employees	Responses
Protidou, 2019	OAED/ employment	Greece	Thesis	Yes	2891	2891	293
Cheili, 2012	OAEE/ social security, 2 reg. directorates	Greece	Thesis	No	50	n/a	50
Grammatikou, 2018	Urban planning services- 6 departments	Greece	Thesis	No	158	158	109
Karamanavi, 2018	Greek public sector/ General	Greece	Thesis	n/a	n/a	n/a	n/a
Karydi, 2010	General Secretariat	Greece	Thesis	Yes	25	n/a	25
Matapa, 2017	Hospital	Greece	Thesis	No	6 interviews	n/a	n/a
Papaioannou, 2018	Region/1 Directorate	Greece	Thesis	No	11 interviews	n/a	n/a
Stampellos, 2018	Region	Greece	Thesis	Yes	106	316	316
Stavrakidou, 2011	Three hospitals	Greece	Thesis	No	110	n/a	106
Triglinaou, 2018	Judicial services-1 department	Greece	Thesis	Yes	138	138	118
Trivella & Nasiopoulos, 2014	General/ Tertiary education in Greece	Greece	Paper	n/a	n/a	n/a	n/a
Tsakalidou, 2011	Five taxation services	Greece	Thesis	No	110	n/a	98
Amaya, 2013	One academic institution	USA	Article	Yes	1738	1738	461
Henntonen et al., 2015	One city-based organization	Finland	Article	Yes	5086	5086	595
Sandhu et al., 2011	Executives in three public organizations	Malaysia	Article	No	320	n/a	170
Syed-Ikhsan & Rowland (a and b), 2014	Ministry / Entrepreneur development	Malaysia	Article	No	204	221	154

(Data Source: Author)

Chapter 9

Implementing a Knowledge Management–Based Model for Lessons Learned

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ABSTRACT

Lesson learning is a well-known and crucial organizational tool that serves many organizations wishing to improve their performance. This chapter describes a knowledge management (KM)-based model, improving the level of learning and of the lessons learned with the goal of reducing repeated mistakes as well as recreating their successes. The key features of the model were the base of a research conducted using a case study approach implemented at the Welfare Division of the Jerusalem Municipality's Community Services Administration. The implemented model, based on KM ideas, added two significant stages to the process of debriefing—refining the lessons learned and transforming them into lessons that are managed in an independent database—as well as an additional stage, which was comprised of active processes of integrating the lessons into the organizational work.

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INTRODUCTION

The Welfare Division at the Community Services Administration of the Jerusalem Municipality provides welfare services to a variety of populations: children, youth, families, individuals, the disabled, the elderly, new immigrants and any individual or group who wish to receive help of a social worker. The division provides information, counseling, care, social services, guidance and mediation for receiving complementing services. The welfare division is the largest of its kind in Israel, and consists of over 600 social workers providing services to approximately 40,000 families.

The Welfare Division at the Community Services Administration of the Jerusalem Municipality has been conducting lesson learning processes since 2006, as part of an excellence in service approach.

The process of transforming and improving the methodology for lesson learning in the division began in 2013. This process included content analysis of the minutes of lesson learning discussions and evaluation of the existing work process.

The content analysis raised several issues:

- Lessons learned in the organization were not being implemented in all its units.
- The process of lesson learning in the organization was not organized or methodical.

As a result, the organization witnessed repeated mistakes and repeated learning of similar lessons.

This information formed the basis for the management's decision to improve the methodology for lesson learning in the division, and to move from 'lesson learning' to 'lesson management' in the beginning of 2015. This change entails managing the entire life-cycle of the lesson learned, and includes, beyond the learning of lessons, processing those lessons, managing them in an independent database and creating mechanisms for increasing the use of this database. All in order to reduce repeated mistakes.

This article describes the proposed model, and examines the results of the intervention using this model at the Welfare Division of the Jerusalem Municipality.

Literature Review: Lesson Learning and Management

Lessons learned (LL) are defined as "knowledge artifacts that convey experiential knowledge that is applicable to a task, decision, or process such that, when reused, this knowledge positively impacts an organization's results." (Weber & Aha, 2003: 1).

This definition encompasses the definition of learning:

Learning is defined by Bunning (1992: 7) as “changes in behavior resulting from experience”; and by Hatch (2006) as learning from the results of previous activities in order to develop behavioral patterns. This entails systematic, methodical conduct (Hatch, 2006).

Jarvis (1999) draws on earlier sources (English & English, 1958): “The traditional definition of learning in the psychology literature is shifts in performance when the stimulus situation and motivation remains essentially the same.” In other words, learning is much more than the acquisition of information and systematic knowledge; it includes the implementation, assimilation, and results (Jarvis, 1999).

The concept of LL is easy to understand when we distinguish between ‘Lessons’ and ‘Lessons Learned.’ Lessons, based on the above definitions, are records of valuable experiences, stating what should or what should not be applied. Such definitions encompass the fact of the knowledge being new, the basis for the knowledge (past experience), its structures, and its applicability (modes of action or decision making).

The complementary definition, of ‘lessons learned,’ would include the definition of learning; i.e. the change in organizational or business results, based on the new obtained knowledge.

The research literature includes many studies of the process of lesson learning, and learning from lessons learned, originating in different academic fields. Dirkx and Levin (1991: 1) state that “The idea of learning from experience has been the focus of scholarship across many disciplines for many years.”, and “although these scholars differ considerably on a number of important issues about adult learning, they all place considerable emphasis on the importance of the learner’s experiences in the learning process (Dirkx & Levin, 1991: 1).

When creating a model for managing lessons learned, it should be based on all of the above, as well as on the issues emphasized in the specific fields:

Bunning (1992), defined action learning as a strategy where people learn with one another, as well as from one another, when they approach identifying and implementing solutions to problems or issues of development which they are concerned. “At the heart of action learning, is the skill of knowing what questions to ask. Learning from experience (both in the immediate past and the here-and-now) comes from being sufficiently detached to analyze and question what is, what has been or what is intended.” (Bunning, 1992: 9).

Nonaka & Takeuchi (1995), believe that the source of knowledge is the individual, yet the process of creating organizational knowledge may be modeled as a dynamic cycle of knowledge transmitted between the project staff, the business system and the knowledge base.

“Experience factory” is an approach developed by Basili, which proposes a model for improving software and processes, based on a working environment where constant improvement is enabled. The environment allows for controlled

experimentation, analysis of development processes, experience packaging, and knowledge reuse (Basili et al., 1994; Arne, Ross & Graham, 2000). According to Basili and his collaborators, an effective database of experiences will contain data that is analyzed, synthesizes and integrated. Furthermore, they note that the knowledge can be stated as a recommendation rather than an imperative (Basili et al., 1994). Literature indicates that this model has been applied in a wide range of organizations, including Daimler-Benz, Siemens, and Q-Labs/Ericson, as well as Kaiserslautern/ Fraunhofer University (Bartllmae & Riemenschneider, 2000).

Lessons learned systems have been described as effective solutions for US governmental organizations, such as the Department of Defense, the Department of Energy, NASA and the US military. Such systems contain processes of lesson learning accompanied by databases where lessons learned are kept and knowledge is disseminated in support of the organization's goals.

CALL define a process of six stages in lessons learned management: information gathering as a tool in identifying learning opportunities; analysis which results in the development of lessons, best practices and recommendations for corrective action; sharing and dissemination of lessons learned; archiving the knowledge in an accessible database or website; problem solving based on the knowledge acquired; and finally, assessment of the results in terms of change.

In accordance with the CALL approach, the lessons that are shared and disseminated in and between organizations are items of information in various formats: manuals, newsletters, periodicals, articles, studies and observation reports. A number of possible tools are described for LL programs, including AAR, based on four questions for learning (CALL, 2011).

Weber, Aha and Becerra-Fernandez (2001, 2003) studied lesson learning systems (LLS) and concluded that effective lesson learning processes can significantly improve decision making processes in organizations, and that they represent an important form of organizational knowledge sharing. Unfortunately, such systems typically fail to deliver lessons when and where they are needed, and thus, they suggest expanding the lessons learned system and model for management.

Johnson's (2015) study of learning and lessons learned processes in computing projects analyzes the tension between the importance of organizational learning and its effect on business effectiveness as studied in the relevant literature on the one hand, and the low level and quality of action in the field. He points to the complexity and inherent difficulties of transferring tacit knowledge between team members and between project teams. He surveys the difficulties entailed in defining distilled knowledge items and knowledge databases based on lessons learned processes. Johnson suggests the adapting a perspective that encompasses the life-cycle of lessons learned: objectives can be achieved more effectively when leaders employ strategies

to exploit knowledge from previous experiences for the purpose of improving the likelihood of success on future projects (Johnson, 2015).

METHODOLOGY

The research conducted is a qualitative research, using a single case study approach. The case study approach was chosen, as it is particularly useful when there is a need to obtain an in-depth appreciation of an issue or phenomenon of interest, in its natural real-life context. The case study was implemented at the Welfare Division of the Jerusalem Municipality's Community Services Administration.

The Proposed Model for Lessons Learned Management

What follows is an expanded model for lesson learned management. This model is based on a synthesis of the existing models described in the above literature review and the model of SECI, a life cycle for knowledge creation (Nonaka & Takeuchi, 1995). It is unique in that it combines mechanisms from different academic disciplines (Dirkx & Levin, 1991).

The suggested life-cycle is comprised of three primary stages:

1. **Lessons Learned:** Creating new knowledge.
2. Refining the LL and managing them in an independent databank.
3. Integrating the LL into the organizational environment.

The model can be described using the following diagram:

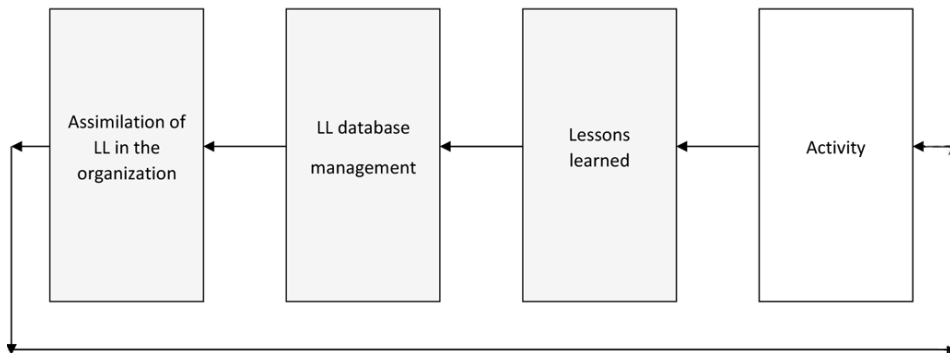
Lesson Learning

The model for managing lessons learned refers to the AAR (After Action Review) method, which is based on methodology developed in the US military.

The methodology includes structured discussion (a conversation), using a form (a template) with four questions at its core:

1. What happened.
2. What we expected to happen.
3. Explaining the discrepancy between expectations and what actually happened.
4. Recommendations for the future.

Figure 1. Life-cycle of lessons learned



The template contains two additional sections: a preliminary section for focusing various aspects of the debriefing process, and a concluding section, which includes tasks and lessons (treated separately), and additional people to be informed.

Refining the LL and Managing Them as an Independent Database

One of the most fundamental differences of the proposed model is the management of the products of the process – the lessons learned – as an independent database. This database is not a library of debrief documents. Such a library already exists, and it is managed, but only as a supporting database that can be turned to for additional details beyond the LL themselves. The LL database, in contrast, is an independent database in the form of a table, where each lesson is registered on a separate row.

Each row in the LL database includes:

- **Title:** A few words indicating the subject of the LL, which enable one to decide whether to read it.
- A summary of the LL learned in 1-3 sentences: what to do, under what circumstances, and the rationale (or price of inaction).
- **Characteristics:** Subject, process, and population for which the lesson is relevant.
- Links to debriefings where the knowledge was gained.
- Links to supporting documents (professional guidelines, briefings, procedures, and anything else that is relevant).
- **Technical Details:** Contributor, date of input, date of most recent updates, etc.
- Rating of the LL.

The lessons learned themselves are worded either as mandatory or as recommendations. The LL are refined before being entered into the database: they are checked to ensure they are formulated in language that is clear and easy to understand; they are tested for acceptance. The LL are incorporated into additional contexts where they might be relevant, beyond the context within which they were created; and the LL are incorporated into the existing database whilst resolving contradictions and removing duplications.

Two managers for the database were appointed: the deputy director's assistant and the Community Services Authority's knowledge manager. They were assigned the responsibility of collecting the debriefings, refining the LL, validating them with the relevant content expert and inputting them into the database in the format described above. Furthermore, the database managers were given overall responsibility for maintaining the database and implementing its use, as will be further described below. The maintenance of the database includes an annual validation of the content, and its updating when necessary. The database itself is accessible through the Authority's web portal and is also linked to from additional relevant specific sites.

Incorporating the Lessons Learned in the Organizational Environment

Another significant difference, which distinguishes this model for LL management from other popular models, is the existence of a third, independent, stage which is concerned with integrating the lessons learned into the general organizational environment. This integration, which is described in this section, includes a range of management, computing, processual and cultural aspects. The integration includes mechanisms for making the knowledge accessible to employees when it is needed, as well as mechanisms for saturation with the new knowledge gained, for strengthening awareness of the existence of superior LL that are worthwhile consulting, and for informing employees about specific new LL.

The new knowledge is pushed through a number of complementary mechanisms:

- **The Operational IT System:** Each time one logs into the system, a random lesson from the LL database is promoted on the homepage.
- **Newsletter:** A newsletter produced every three months and sent by email to all division employees, contains information about the range of LL in the database, and promotes a number of new or interesting LL.
- **Senior Management Meetings:** Meetings of the division's senior staff includes regular presentations of "flash lessons" based on new LL.
- **Annual summaries:** an annual summary report on the LL database, including its size and usage, is created and disseminated.

Implementing a Knowledge Management-Based Model for Lessons Learned

- **Division Web Portal:** Various pages of the division's professional web portal include a window that displays LL from the database, arranged from the newest to the oldest, so that most recent lessons learned are those seen first.
- Implementation and training activities initiated by the database managers are held in various headquarters and field offices.

Each new LL is evaluated for incorporation in:

- Relevant work procedures.
- Meetings of work teams addressing this content subject.
- Forms or templates related to ongoing work processes.

While preparing for recurring events and activities (emergency drills, interventions in individual/family emergencies, Authority days, and the like), the lessons learned database is consulted regularly in order to identify LL that are relevant to these events.

Summary of the Model

The model is presented in Table 1, based on the relevant research literature discussed above, with the main suggested methodological emphases:

This model includes the various components of learning described by Jarvis. It includes methodical imparting of the knowledge; and processing and implementing knowledge, inclusive of regular implementation mechanisms. It enables what is defined as 'learning' in the professional literature.

Implementation of the LL Management Model

Background

The chosen organization for validating the suggested methodology was the Welfare Division of the Jerusalem Municipality's Community Services Administration. Prior to starting the intervention Preliminary management, lesson learning took place for a several years, yet lesson learning was inconsistent and did not follow a methodology, and lessons did not turn into common knowledge, resulting in recurring similar events.

At the start of 2014, it was decided to incorporate the knowledge management based model in the LL process: the unit charged with knowledge management at the Community Services Administration became a partner and professional guide on the subject.

Table 1. Theoretical and methodological foundations

Methodological Emphasis	Theoretical Sources
Manage and maintain the entire life-cycle of the LL, rather than simply producing the knowledge.	Basili et al., 1994; Nonaka & Takeuchi, 1995; Levy, 2017
The LL life-cycle must be based on the production of the knowledge, its storage and the means for its reuse.	CALL, 2011
Knowledge is acquired as the result of a process of debate or discussion. Such a discussion will be based on questions.	Bunning, 1992; Nonaka & Takeuchi, 1995
Analyze, synthesize, and refine the LL and create a high quality database of LL.	Basili et al., 1994
integration and merging of the lessons learned.	Basili et al., 1994
A lesson is brief: one to a few sentences.	--
LL might be either a must or a recommendation.	Basili et al., 1994
The knowledge offered by the LL must be applicable.	Ross & Graham, 2000
The knowledge is managed in an independent database.	Basili et al., 1994; Arne, Ross & Graham, 2000
Creation of mechanisms for disseminating and implementing the knowledge.	CALL, 2011

Launch and Establishing Infrastructure

The appropriate infrastructure was prepared over the course of 2014: a discussion summary template, a preliminary database of lessons learned and the first round of training. The discussion summary template was based on the After Action Review (AAR) method, with the addition of supplementary guidelines in accordance with the Administration's needs.

The preliminary database was created from previous debriefing documents, which underwent a process of refinement in terms of precision, language and scope, as well as validation with the relevant content experts. The database was uploaded to the shared environment: the community web portal.

The first round of training targeted coordinators and managers (both at HQ and in the field), and it was incorporated in staff meetings of the various units. The training dealt with the importance of the lesson learning process, its methodology and implementation methods.

Implementation Process

In January 2015 the process of implementing change in the Division was begun.

The implementation plan included:

Implementing a Knowledge Management-Based Model for Lessons Learned

1. Setting a quota for lesson learning discussions for each unit in the division. This had actually been done earlier, and it was decided to continue the practice with an additional managerial emphasis.
2. Guidance of the lesson learning discussions and assistance with writing up the discussion summaries in the proposed template.
3. Creation of a permanent interface with the unit in charge of public complaints and inquiries in order to launch the LL processes.

The process of validating and refining lessons continued concurrently, as the database was expanded.

Different emphases were given to the guidance provided at HQ and in the field, in accordance with the nature of duties and responsibilities.

HQ employees were also asked to assume responsibility for implementing the LL in areas under their purview, from a comprehensive organizational perspective.

Along with improving the lesson learning processes and expansion of the database, actions were taken to incorporate the LL in the organizational environment, both as new LL to be located and as reminders.

Actions taken to improve the location of the LL:

1. Displaying the LL for each subject in the community portal's professional content area.
2. A dedicated content area in the community portal was dedicated to the LL. It included the LL database and discussion summaries leading to those LL. The area also contains the relevant documents from the lesson learning process and its implementation.
3. A link to an archive dedicated exclusively to the subject, where all information about LL management was centralized (discussion summaries, guidelines, and the LL database).
4. Incorporation of search options in the portal's general search engine, which also refer to LL; and incorporation of a dedicated search mechanism in the LL database itself.

Actions taken to increase awareness and knowledge of the LL, and to keep the issue on the organization's agenda:

1. Distribution of a quarterly newsletter to all division employees with information about new LL and about the progress of the implementation process. The newsletter included direct links to discussion summaries and the LL database.
2. Incorporation of a sample LL in the welcome screen of the primary operating system serving the Welfare Division staff ("A lesson for the road"). The LL is

changed once a week in accordance with management preferences, the season and more. Link from this work area to the LL database.

3. **“Lesson Flash”**: A regular quarter hour-long update about new LL at senior staff meetings. At each meeting, a different senior manager was asked to present a lesson learning process from their field, as well as the LL from the event.
4. Regular dialogue with the staff in the various units for repeated exposure to the methodology, to raise awareness of the topic’s importance, and to introduce the tools and products.

Expansion of the Implementation

Following the positive reception of the concept and its implementation:

1. The methodology was presented to additional divisions within the Administration (Employment, Health, and Immigration Absorption) and it was decided to expand the implementation to these units as well, while establishing the appropriate infrastructure.
2. The concept and its implementation were presented to the Mayor and the Director General, and lesson learning was declared a focus program at the Community Services Administration.

Monitoring and Control

The process of implementing LL management was accompanied by monitoring and control activities:

- Distribution of annual summary reports on the topic of lesson learning, which included quantitative and organizational aspects of the program’s implementation process.
- Quarterly monitoring of efforts to implement the LL.
- An annual survey of all Administration employees on the subject of using the LL (June 2016).
- Annual monitoring of activity indices (number of debriefings, scope of ILL in the database).
- Annual discussion of the implementation’s progress by senior management.

Research Methodology: Assessing the Model’s Effectiveness

The research method selected was a combination of qualitative and quantitative research. Research tools included:

Implementing a Knowledge Management-Based Model for Lessons Learned

- Employee surveys.
- In-depth surveys.
- Content analysis of the LL database.

The Study Design

1. Development of research tools.
2. **Survey:** Distribution of the survey mid-way through the process (in 2016) and at the conclusion of the implementation process (2017) to all professional staff in the Welfare Division, in order to learn:
 - To what extent staff improved lesson learning as a result of the change in work methods.
 - To what extent staff were using the lessons learned (knowledge gained) based on the debriefings.
 - To what extent these tools help, in the staffs' opinion, to improve their work performance and improve customer service.
3. **Interviews:** Questionnaire-based interviews of key position holders at HQ and in the field. The interviews repeated the survey questions, with requests for further details and depth, as well as discussion of additional LL, when relevant.
4. **Success Stories:** Collecting success stories and additional feedback that was received during the implementation process in 2015-2017.
5. **Data Collection:**
 - Scope of the debriefings conducted with the new methodology.
 - Scope of the LL in the LL database.
 - Scope of recurring similar problems in the debriefings.
 - Scope of similar LL emerging from debriefings.
6. **Analysis:** Processing the data into findings; conclusions.
7. Writing a summary research report.

Study Population

A survey on the subject of using the LL was distributed to all employees of the Welfare Division. About 70 of the 600 division employees responded to the survey questionnaire. The Distribution of respondents is presented below:

About 12 in-depth interviews were conducted with employees in various positions (staff, managers, coordinators, trainers, from both the field and headquarters) of the Welfare Division, using a cross-section representative of the areas in which they worked (rehabilitation, family, elderly).

Implementing a Knowledge Management-Based Model for Lessons Learned

Figure 2. Distribution of survey population by position level

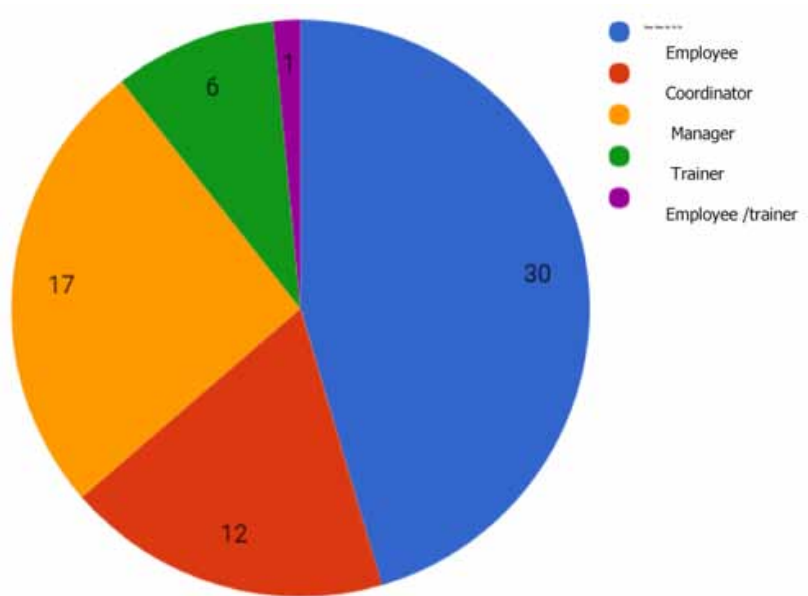
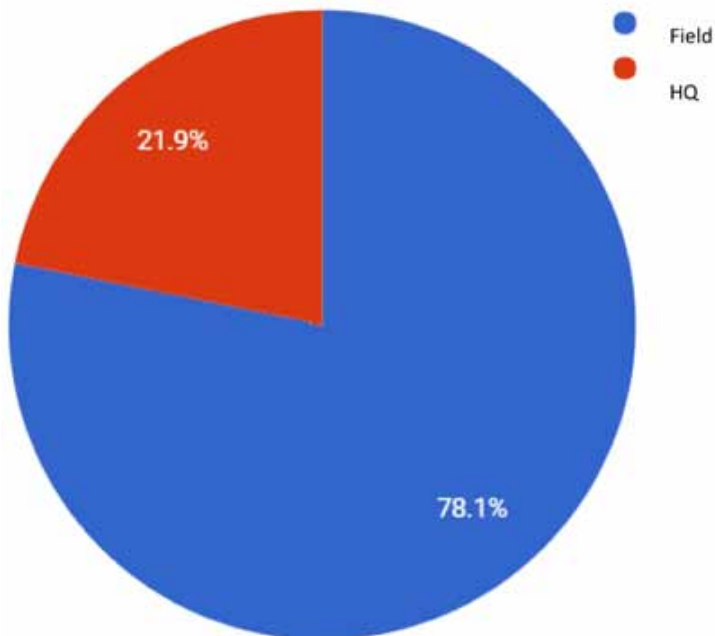
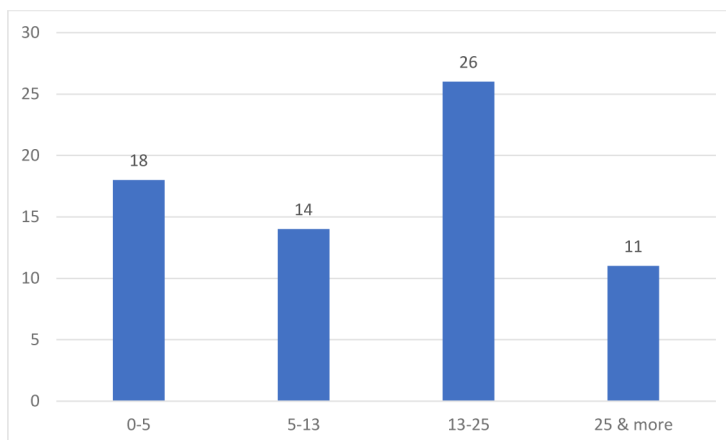


Figure 3. Distribution of survey population by position type



Implementing a Knowledge Management-Based Model for Lessons Learned

Figure 4. Distribution of survey population by seniority



FINDINGS

This section presents the main findings regarding the contribution of the enhanced method of LL management to improving the work of the Welfare Division:

Findings Regarding the Implementation of LL Processes

Increased Scope of LL Discussions at the Welfare Division

The extent of lesson learning in the Welfare division grew, relative to the beginning of the implementation process:

Lesson learning processes are viewed as significant tools by both staff and managers:

- *“Committed to it. At the area level, each manager should produce twice a year.”*

Table 2. Extent of lesson learning discussions

Lesson Learning Processes		
Year	Number of LL	Percentage Increase
2014	15	
2015	18	20%
2016	25	39%

Implementing a Knowledge Management-Based Model for Lessons Learned

- *“The topic exists in the dialogue of training sessions.”*
- *“Very necessary, even crucial, to the work process. A must in a complex system with so many interfaces, some of which are complex, and work that is distributed between a number of position holders.”*

LL Discussions at Additional Divisions of the Community Services Administration

Following the transformation process in the Welfare Division, the LL process was implemented in additional divisions of the Community Services Administration: public health services, the municipal authority for immigration absorption, and the department of community works and resources.

LL Process is More Collaborative

Feedback from managers reveals that more actors participate in the LL discussions as a result of the LL processes intervention. The circles of collaboration exist at three levels:

1. With partners in additional units of the Division or the Administration.
2. With partners in other Municipality administrations.
3. With partners outside of the municipality.

“LL is perceived as a tool for dialogue among a broad team that included people from different services and in different roles... The method of conversing through a LL discussion (a structured discussion based on AAR) was implemented to resolve work conflicts with partner organizations. In other words: We hold LL discussions with interfacing organizations when the handling of a case is complex (and requires collaboration between all relevant organizations, coordinating expectations, sharing of identifying information, and agreeing on one single treatment manager for the process of working with the customer), not necessarily as a result of a mishap/mistake that happened.”

Quality of Discussions Improves

Following the changes to the work process, employees reported an improvement in the quality of the LL discussions as a result of the systematic and methodical work process. Quotes:

Implementing a Knowledge Management-Based Model for Lessons Learned

- *“The way it was done in the past was unpleasant, by blaming, ‘let’s get the person to blame.’ Since the change, it’s been more effective, less looking for the person to blame.”*
- *“More organized. [We] don’t just write a summary but derive LL, procedures, briefings.”*
- *Previously it wasn’t constructive, and now there are LL that can be applied from one case to the other.”*
- *“Now it’s more structured, part of a self-evident process, in the past it was done intuitively, internally, as a team brainstorming with the managers. Today you can feel a change also at the level of distribution beyond, it doesn’t stay at the personal level.”*

Findings Regarding the LL Database

The regulation of an entire process for managing LL expanded the scope of the lessons and the topics they addressed:

Awareness of the LL Increased

The process of implementing LL management increased awareness of and attention to the recurring mistakes and similar LL, as they came up:

“I would like to report that following the meeting on LL, I am at the beginning of a process of implementing the issue among... sometimes in certain cases, especially those which raise dilemmas, we try to study the case and learn from similar cases (if there were) in the past.”

“In preparatory meetings with employees for the staff meetings (each staff member takes a turn being responsible for a staff meeting), in accordance with the subject, I bring up the existing LL on the subject we will discuss and we incorporate them into the meeting. The rationale is to make the connection regarding the importance

Table 3. Scope and topics of LL

	Baseline LL Database (Prior to Change)	LL Database at End of 2016 (After Change Process)
Number of LL	92	317
Content areas covered by LL	Core LL for direct application	Organizational LL Core LL for direct application LL for community work LL for the immigration and absorption authority

of being familiar with the existing LL when studying a particular issue as part of the knowledge on the topic.”

Refining the LL for the Database Creates a High Quality Knowledge Base

The quality of the LL in the LL database is high: 76% of respondents stated that the LL were worded in way that was easy to understand (very much, extremely). 53% stated that the LL were worded in a professional and innovative way.

The Existence of a Shared Database Where All the LL are Centralized is Important

“The ability to go in and make deductions based on other LL is greater thanks to the database.”

“The database touches on all areas, all subjects, [it] enables broader exposure.”

“[I] makes use, at two levels: control over what happens here, as well as examination of specific things – an emergency situation where there was related LL process, so I went to look it up in the database. If [I] know there was lesson learning, I will go look there, but not for a random search.”

“... she used the LL in the database to remind employees what had been decided.”

Despite the Importance of the Database and its Contents, Few LL Were Accessed

Use of the database to “extract” information was low; most respondents (58%) do not initiate searches in the database.

“[I] don’t use [it] enough, mostly because you need time for it. Sometimes, when a summary is sent, I go into the database. Mostly for things that drew my attention to areas that interest me, I go in and read the summaries.”

“In general the employees do not use the portal enough, are not exposed enough to the database. It’s more effective to send an email.”

“The employees are very busy, if they have a few moments they will use them for other things and not necessarily for surfing in the portal.”

Findings Regarding Integration of Knowledge in the Organizational Environment

Most of the Learning of New LL is the Result of Their Deliberate Integration into the Organizational Environment

Implementing a Knowledge Management-Based Model for Lessons Learned

Despite the above noted low rates of accessing the LL database, most respondents (87%) are familiar with the LL that are relevant to their duties. Familiarity with the new LL is due primarily to their integration in the organizational environment:

The Newsletter for Disseminating Knowledge:

Responses:

- *“Well done!!!”*
- *“How wonderful! Well done! You can’t ‘spoon-feed’ more than this... Hope it affects the implementation of the LL.”*
- *“Very good job, especially the refining of the LL and centralizing them in one place. I will use it for on-call.”*

Integration in Computer Systems:

- *“Lesson for the road – charming, accessible to all the employees, the language is easy to understand” (from interviews).*
- *“That’s ... the advantage of the lesson on the road is that it reaches you.” (from interviews).*
- *“Well done on the idea of writing up the various LL from the lesson learning processes in the welfare system. Great idea.”*
- *“I wanted to give kudos for the LL appearing on the welfare screen. Very prominent and very convenient. Good idea...”*
- *“Simply amazing!!!”*
- *“Charming idea. By change I opened up the welfare system today even before Outlook and saw the LL – accessible and clear.”*

Learning of the LL Also Takes Place in Informal Channels

Employees share knowledge with one another, beyond the formal channels:

42% of respondents reported that they learn new LL from colleagues, through informal sharing arenas.

Findings Regarding the Knowledge’s Contribution to the Work of the Welfare Division

Knowledge Gained from the LL Assists the Work Processes

69% of respondents report that the LL help them in carrying out their work to a certain and up to great extent.

“I used the LL from the debriefings I attended, and I used the LL in the database to remind the employees of the decisions made.”

Use of the LL to Benefit Direct Service to the Customer

32% of the respondents report that they use the LL during direct intervention with the customer:

“An emergency order event, there was apprehension about serving an emergency order to a violent client and therefore they wanted to use the police. That didn’t work out, and it was agreed that when he reports in they would contact the police by phone. The man reported to the bureau and the police officer asked to speak to him so she could summon him for police questioning. The manager insisted that this wasn’t the right place, as a result of a LL she had internalized, that the criminal process and the legal-treatment process should be separate. The police officer was really angry. But as an employee she had the support of the manger, based on the implementation of the LL (“there is such a lesson learned!”). It’s not always easy to realize the LL in the database, but they reverberate in the day-to-day work.”

“In an event of a woman leaving for a shelter with children, the question arose whether the father could speak with the children. As a result of the lesson learning the procedures are much clearer, and the employee can go to the shelter and tell them how to do things from a position of authority, also vis-à-vis the women, communicate what their rights and obligations are... in the specific case external elements (shelter) were involved and therefore she could refer to what had come up in the LL processes, because it reflected there as well.”

“Following the tragic case of ..., in similar situations there is extra care in the decision making process. [We] go back to the LL from the debriefings, emphasizing taking care not to act out of anxiety or defensiveness.”

Use of LL to optimize work processes in order to improve service

The LL were also used significantly for internal organizational work processes aimed at improving services: Learning, 57%; training, 37%; writing/updating procedures, 17%.

Most of the interviews revealed that lesson learning processes and using those LL, result in promoting the employees’ performance of their duties, improve work methods, identify work processes requiring refining/redefining, manage work processes with partners, and more:

“Optimizes the organizational, professional processes. For example, an emergency arrangement for an elderly man which insisted on including the demand that the old man’s voice be heard in the LL Process.

“... the LL discussion highlighted the lacks, and subsequently there was a mandatory procedure. At the same time, there are LL discussions where there are no dramatic LL, and that’s ok, because in such cases too, the act of stopping, the

discussion, develops the macro perspective that people in the organization lack very much.”

“Very significant, very helpful. There were questions and things that weren’t completely clear about the intervention, and the LL Process caused [] to sit down with very significant position holders, who also set policy, and design a way to act in similar cases. There were a lot of questions that I didn’t have answers to in the midst of the event, and during the LL process there was time to stop, think and design future action.”

“Has an effect, enables learning from other’s LL. [She] tries to read in subjects that interest her, where work directives come from in certain situations. It creates a basis for new directives, new ideas. For example, the subject of battered women (she couldn’t remember all the details), they used a LL produced by someone else. Also in another case of going into an area of outer Jerusalem where the police won’t go, and no house visits are made: as a result of a LL process there was a directive that two employees go, and the very act of lesson learning and the decision made as a result, it was very helpful.”

“Following the LL process, an updating of directives was carried out regarding care-planning committees/ consulting in situations prior to birth and preparations for the birth of child that we estimate might be at risk.”

Findings Regarding Learning Outcomes

Reduced Recurrence of Similar Problems

The model for managing the entire life-cycle of LL was tested, by examining the recurrence of similar problems. There were no significant quantitative results, which indicate with certainty a change in the extent of recurring similar problems. All the same, many employees spoke in their interviews about the improvements as a result of the intervention and about avoiding repeating similar problems as a result of their acquaintance with the LL. For example:

“The debriefing we did at the time over the case of an institutional placement for an elderly man was important, because that was how we learned that it was necessary to bring together all the forces before it blows up, and that was how it was in that case... and this time it worked the way it should (July 2015).

Recurrence of Similar LL Reduced

Another indicator of the success of the full model for managing LL is the extent of recurring similar LL. An analysis of similar recurring LL revealed that:

1. There was a certain improvement in reducing the recurrence of similar LL.
2. When distinguishing the LL which required intrinsic treatment and a process of change management from more narrowly-focused LL, where just knowledge of them is significant to their implementation, the findings are even clearer.

These findings are summarized in Table 4 below:

Notes:

- There was no significance to examining recurring LL in 2014, since the database was only established at that time.
- The distinction between a focused LL and LL requiring a change management process was made by a social worker with expertise in the relevant content area. For example, coordination between workers, or handling of professional disagreements between employees.

This finding indicates that the LL management process is not enough and that active change management processes are needed in order to ensure improvement in places where the knowledge, in and of itself, is insufficient to ensure the correct execution.

DISCUSSION

The findings learned in the research are significant. It can be learned that the LL process had contribution both to quantity (increased scope; additional divisions) and to quality (collaborative process; improved discussions) of learning processes.

The existence of a shared database (LL database) was found to be important, yet accessed directly only partially.

Learning did take place, both through formal integration processes and informal channels.

Workers found the knowledge learned to be beneficial to their job, helping them provide better service to customers.

Table 4. Recurring similar LL

	Focused LL		Intrinsic LL Requiring Change	
	Recurring	Total	Recurring	Total
2015	3	104	6	27
2016	2	93	12	50

These findings demonstrate the ideas presented by Basili which proposes a model and environment that include work processes, analysis, packaging, and knowledge reuse.

CONCLUSION

The findings discussed above lead to a number of conclusions:

Managing a comprehensive life-cycle that includes a systematic methodology for lesson learning, a refined database of LL and means for integrating the knowledge in the organizational environment does indeed improve learning:

1. More lesson learning takes place.
2. The lessons learned are of higher quality.
3. The importance of learning and avoiding repeat mistakes lead to LL remaining on the organization's agenda.

The knowledge contributes to the organization's functions at two levels: both in direct processes of providing services to customers, and in internal organizational work processes. A certain reduction in the extent of recurring similar problems was observed as a result of this combined perception of procedures, and more significant reduction was observed in the extent of repeated similar LL (especially those where the knowledge itself was relevant to the repeated use).

There are a number of limitations to this research, primarily, the absence of a control group in which there was no complete life-cycle of LL management or, alternatively, a control group with such a LL management, but using a different methodology. The only comparison is between different time periods: before the intervention and study, and following them.

In light of these findings and conclusions, a study should be considered that will take place in five years, after continued implementation of the approach and the completion of a longer process.

Research as to the implementation of the proposed model was based in this research on one case study. Future research is required both to base the hypothesis on more organizations, as well as to examine the level of use of the methodology, the extent of similar recurring problems and the extent of repeated similar LL. Such an analysis, carried out after a significant time has passed, will be able to indicate the stability of the change and its level of effectiveness.

REFERENCES

- Arne, K., Ross, J., & Graham, L. (2000). Lessons learned from the failure of an experience base initiative using a bottom-up development paradigm. In *Proc. 24th Annual NASA-SEL Software Engineering Workshop*. NASA Goddard Space Flight Center.
- Bartlmae, K., & Riemenschneider, M. (2000). Case Based Reasoning for Knowledge Management in KDD-Projects. *Proc. of the Third Int. Conf. on Practical Aspects of Knowledge Management*.
- Basili, V. R., Caldiera, G., & Rombach, H. D. (1994). The Experience Factory. In *Encyclopedia of Software Engineering*. John Wiley & Sons.
- Bunning, C. (1992). Turning Experience into Learning: The strategic Challenge for Individuals and Organizations. *Journal of European Industrial Training, Bradford, 16*(6), 7–12. doi:10.1108/03090599210014980
- CALL. (2011). *Establishing a Lessons Learned Program: Observation, Insights and Lessons*. CALL.
- Dirkx, J. M., & Lavin, R. (1991). *Understanding and Facilitating Experience-Based Learning in Adult Education: The FOURthought Model*. Midwest Research-to-Practice Conference, St. Paul, MN. Retrieved from <http://dirkx.wiki.educ.msu.edu/file/view/EBLRVS.91.pdf>
- Hatch, M. J. (2006). *Organization Theory*. Oxford.
- Jarvis, C. B. (1999). *Learning (or failing to learn) from experience: The dysfunctional implications of counterfactual thinking in reviewing past events to improve marketing performance* (Doctoral dissertation). Indiana University.
- Johnson, K. L. (2015). *Organizational learning from information technology projects: A case study exploring lessons learned* (Doctoral dissertation). Capella University.
- Levy, M. (2017). *A Holistic Approach to Lessons Learned: How Organizations Can Benefit from Their Own Knowledge*. CRC Press. doi:10.1201/9781351235549
- Nonaka, I., & Takeuchi, H. (1995). *The Knowledge Creating Company*. Oxford University Press.
- Weber, R., Aha, D. W., & Becerra-Fernandez, I. (2001). Intelligent Lessons Learned Systems. *Expert Systems with Applications, 20*(1), 17–34. doi:10.1016/S0957-4174(00)00046-4

Weber, R. O., & Aha, D. W. (2003). Intelligent delivery of military lessons learned. *Decision Support Systems*, 34(3), 287–304. doi:10.1016/S0167-9236(02)00122-7

KEY TERMS AND DEFINITION

AAR: After action review; a technique for debriefing developed in the US army.

Best Practice-Experience: New knowledge created, based on past practice, without using pro-active processes to obtain this new knowledge.

Debrief: A process of reviewing and analyzing past activities, in order to learn lessons as how to act in the future.

Knowledgebase: Database storing knowledge pieces of content (lessons or experiences).

Learning: Change in behavior and shift in performance resulting from use of lessons and experiences.

Lesson: New knowledge created, based on past experience, via a pro-active process.

Compilation of References

Abbasi, G. Y., & Al-Mharmah, H. A. (2000). Project management practice by the public sector in a developing country. *International Journal of Project Management*, *18*(2), 105–107. doi:10.1016/S0263-7863(98)00074-X

Abrams, L. C., Cross, R., Lesser, E., & Levin, D. Z. (2003). Nurturing interpersonal trust in knowledge-sharing networks. *The Academy of Management Executive*, *17*(4), 64–77. doi:10.5465/ame.2003.11851845

Accident Prevention. (1993). The failure on take-off sets stage for fatal inflight fire and crash. *Flight Safety Foundation*, *50*(9), 1–6.

Aharony, N. (2008). Web 2.0 in Schools of Library and Information Science in the USA: Are we missing the boat? *Ariadne*, *54*.

Airbus. (2014). *Commercial aviation accidents 1958-2014: a statistical analysis*. Retrieved from <http://asndata.aviation-safety.net/industry-reports/Airbus-Commercial-Aviation-Accidents-1958-2014.pdf>

Akerkar, R. (2014). Analytics on Big Aviation Data: Turning Data into Insights. *IJCSA*, *11*(3), 116–127.

Akhavan, P., Jafari, M., & Fathian, M. (2006). Critical success factors of knowledge management systems: A multi-case analysis. *European Business Review*, *18*(2), 97–113. doi:10.1108/09555340610651820

Al-Hakim, L.A.Y., & Hassan, S. (2011a). The Role of Middle Managers in Knowledge Management Implementation for Innovation Enhancement. *International Journal of Innovation, Management and Technology*, *2*(1).

Al-Hakim, L.A.Y., & Hassan, S. (2011b). The role of middle managers in knowledge management implementation to improve organizational performance in the Iraqi mobile telecommunication sector. *Interdisciplinary Journal of Contemporary Research in Business*, *3*(5), 948–965.

Al-Kurdi, O., El-Haddadeh, R., & Eldabi, T. (2018). Knowledge sharing in higher education institutions: A systematic review. *Journal of Enterprise Information Management*, *31*(2), 226–246. doi:10.1108/JEIM-09-2017-0129

Compilation of References

- Allameh, S. M. (2018). Antecedents and consequences of intellectual capital: The role of social capital, knowledge sharing and innovation. *Journal of Intellectual Capital*, 19(5), 858–874. doi:10.1108/JIC-05-2017-0068
- Allen, J., James, A. D., & Gamlen, P. (2007). Formal versus informal knowledge networks in R&D: A case study using social network analysis. *R & D Management*, 37(3), 179–196. doi:10.1111/j.1467-9310.2007.00468.x
- Allianz. (2014). *Global aviation safety study: a review of 60 years of improvement in aviation safety*. Retrieved from <https://www.agcs.allianz.com/assets/PDFs/Reports/AGCS-Global-Aviation-Safety-Study-2014.pdf>
- Altbach, P. G., Reisberg, L., & Rumbley, L. E. (2019). *Trends in global higher education: Tracking an academic revolution*. Leiden, The Netherlands: Brill Sense.
- Amaya, A. T. (2013). Determinants of knowledge sharing in a public sector organization. *Journal of Knowledge Management*, 17(3), 454–471. doi:10.1108/JKM-11-2012-0369
- Anantmula & Kanungo. (2005). Establishing and Structuring Criteria for Measuring Knowledge Management Efforts. *Proceedings of the 38th Hawaii International Conference on System Sciences*.
- Anbari, F. T., Carayannis, E. G., & Voetsch, R. J. (2008). Post-project reviews as a key project management competence. *Technovation*, 28(10), 633–643. doi:10.1016/j.technovation.2007.12.001
- Anderson, C. R., & McLachlan, S. M. (2016). Transformative research as knowledge mobilization: Transmedia, bridges, and layers. *Action Research*, 14(3), 295–317. doi:10.1177/1476750315616684
- Andreeva, T., & Kianto, A. (2012). Does knowledge management really matter? Linking knowledge management practices, competitiveness and economic performance. *Journal of Knowledge Management*, 16(4), 617–636. doi:10.1108/13673271211246185
- Angius, S., Frati, C., Gerken, A., Härle, P., Piccitto, M., & Stegemann, U. (2011). Risk modeling in a new paradigm: Developing new insight and foresight on structural risk. *International Journal of Financial Research*, 2(1), 178–196.
- Aranganathan, P., & Lakshmi, J. (2010). *Knowledge management in Indian information technology (IT) organizations in teaching jobs*. Available at: ww.indianmba.com/Faculty_Column/FC1137/fc1137.html
- Arellano, I., & Jones, S. J. (2018). Exploration of university faculty perceptions and experiences of service-learning as engaged scholarship of teaching and learning. *The Journal of Scholarship of Teaching and Learning*, 18(4). doi:10.14434/josotl.v18i4.23178
- Arivananthan, M. (2015). *Knowledge Exchange Toolbox Group methods for sharing, discovery and co-creation*. Knowledge Exchange Unit, in the Policy, Strategy and Networks Section, in UNICEF's Division of Data, Research and Policy (DRP).

ARMS. (2010). *The ARMS methodology for operational risk assessment in aviation organisations*. Retrieved from <https://www.easa.europa.eu/document-library/general-publications/arms-methodology-operational-risk-assessment-2007-2010>

Arne, K., Ross, J., & Graham, L. (2000). Lessons learned from the failure of an experience base initiative using a bottom-up development paradigm. In *Proc. 24th Annual NASA-SEL Software Engineering Workshop*. NASA Goddard Space Flight Center.

Arora, E. (2011). Knowledge Management In Public Sector. *Journal of Arts Science and Commerce*, 2(1), 165–171.

Aubry, M., Müller, R., Hobbs, B., & Blomquist, T. (2010). Project Management Offices in Transition. *International Journal of Project Management*, 28(8), 766–778. doi:10.1016/j.ijproman.2010.05.006

Aven, T. (2016). Risk assessment and risk management: Review of recent advances on their foundation. *European Journal of Operational Research*, 253(1), 1–13. doi:10.1016/j.ejor.2015.12.023

Barach, P., & Small, S. D. (2000). Reporting and preventing medical mishaps: Lessons from non-medical near miss reporting systems. *British Medical Journal*, 320(7237), 759–763. doi:10.1136/bmj.320.7237.759

Barlas, Y. (1996). Formal aspects of model validity and validation in system dynamics. *System Dynamics Review: The Journal of the System Dynamics Society*, 12(3), 183–210. doi:10.1002/(SICI)1099-1727(199623)12:3<183::AID-SDR103>3.0.CO;2-4

Barlas, Y., & Carpenter, S. (1990). Philosophical roots of model validation: Two paradigms. *System Dynamics Review*, 6(2), 148–166. doi:10.1002/dr.4260060203

Barley, W. C., Treem, J. W., & Kuhn, T. (2018). Valuing multiple trajectories of knowledge: A critical review and agenda for knowledge management research. *The Academy of Management Annals*, 12(1), 278–317. doi:10.5465/annals.2016.0041

Barnett, A. (2010). Cross-national differences in aviation safety records. *Transportation Science*, 44(3), 322–332. doi:10.1287/trsc.1090.0313

Bartllmae, K., & Riemenschneider, M. (2000). Case Based Reasoning for Knowledge Management in KDD-Projects. *Proc. of the Third Int. Conf. on Practical Aspects of Knowledge Management*.

Barzilai-Nahon, K. (2009). Gatekeeping: A critical review. *Annual Review of Information Science & Technology*, 43(1), 1–79. doi:10.1002/aris.2009.1440430117

Basili, V. R., Caldiera, G., & Rombach, H. D. (1994). The Experience Factory. In *Encyclopedia of Software Engineering*. John Wiley & Sons.

Bayley, J. E., Phipps, D., Batac, M., & Stevens, E. (2018). Development of a framework for knowledge mobilisation and impact competencies. *Evidence & Policy: A Journal of Research. Debate and Practice*, 14(4), 725–738. doi:10.1332/174426417X14945838375124

Compilation of References

- Beaubien, J. M., & Baker, D. P. (2002). A review of selected aviation human factors taxonomies, accident/incident reporting systems, and data collection tools. *International Journal of Applied Aviation Studies*, 2(2), 11–36.
- Bejinaru, R. (2016). Knowledge dynamics impact on intellectual capital in organizations. *Journal of Management Dynamics in the Knowledge Economy*, 4(4), 515–534.
- Bejinaru, R., & Prelipcean, G. (2017). Successful strategies to be learnt from world-class universities. In *Proceedings of the 11th International Conference on Business Excellence* (pp.469-492). Bucharest, Poland: ASE. 10.1515/picbe-2017-0037
- Bennett, S. A. (2004). The 1st July 2002 mid-air collision over Uberlingen, Germany: A holistic analysis. *Risk Management: An International Journal*, 6(1), 31–49. doi:10.1057/palgrave.rm.8240171
- Bhatt, D. (2001). Knowledge management in organisations: examining the interaction between technologies, techniques and people. *Journal of Knowledge Management*, 5(1), 68-75.
- Bigliardi, B., Galati, F., & Petroni, A. (2014). How to effectively manage knowledge in the construction industry. *Measuring Business Excellence*, 18(3), 57–72. doi:10.1108/MBE-10-2013-0055
- Birkinshaw, J. (2001, March). Why is Knowledge Management So Difficult? *Business Strategy Review*, 12(1), 11–12. doi:10.1111/1467-8616.00161
- Boeing. (2007). *AERO: a quarterly publication*. Retrieved from http://www.boeing.com/commercial/aeromagazine/articles/qtr_2_07/AERO_Q207.pdf
- Borgatti, S. P. (2002). *NetDraw: Graph Visualization Software*. Lexington, KY: Analytic Technologies.
- Borgatti, S. P., & Cross, R. (2003). A relational view of information seeking and learning in social networks. *Management Science*, 49(4), 432–445. doi:10.1287/mnsc.49.4.432.14428
- Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). *UCINET 6 for Windows: Software for Social Network Analysis*. Lexington, KY: Analytic Technologies.
- Borgatti, S. P., & Foster, P. C. (2003). The network paradigm in organizational research: A review and typology. *Journal of Management*, 29(6), 991–1013. doi:10.1016/S0149-2063(03)00087-4
- Borgatti, S. P., & Li, X. (2009). On social network analysis in a supply chain context. *The Journal of Supply Chain Management*, 45(2), 5–22. doi:10.1111/j.1745-493X.2009.03166.x
- Boulding, K. E. (1956). General Systems Theory: The skeleton of science. *Management Science*, 2(3), 197–208. doi:10.1287/mnsc.2.3.197
- Bourn, D. (2018). *Understanding global skills for 21st Century professions*. New York, NY: Springer. doi:10.1007/978-3-319-97655-6

- Bowen, D. E., & Ostroff, C. (2004). Understanding HRM–firm performance linkages: The role of the “strength” of the HRM system. *Academy of Management Review*, 29(2), 203–221.
- Bower, J.L. (1986). *Managing the Resource Allocation Process*. Boston: Harvard Business School.
- Bower, M., Woo, K., Roberts, M., & Watters, P. (2006). *Wiki pedagogy- a tale of two wikis*. Ultimo: Information Technology Based Higher Education and Training. doi:10.1109/ITHET.2006.339764
- Bowers, A. M. (2017). University-community partnership models: Employing organizational management theories of paradox and strategic contradiction. *Journal of Higher Education Outreach & Engagement*, 21(2), 37–64.
- Brass, D. J., Galaskiewicz, J., Greve, H. R., & Tsai, W. (2004). Taking stock of networks and organizations: A multilevel perspective. *Academy of Management Journal*, 47(6), 795–817.
- Bratianu, C. (2015). *Organizational knowledge dynamics: Managing knowledge creation, acquisition, sharing, and transformation*. Hershey, PA: IGI Global. doi:10.4018/978-1-4666-8318-1
- Broekkamp, H., & van Hout-Wolters, B. (2007). The gap between educational research and practice: A literature review, symposium, and questionnaire. *Educational Research and Evaluation*, 13(3), 203–220. doi:10.1080/13803610701626127
- Brown, C. (2014). Advancing policy makers’ expertise in evidence-use: A new approach to enhancing the role research can have in aiding educational policy development. *Journal of Educational Change*, 15(1), 19–36. doi:10.1007/10833-013-9224-7
- Brown, J. S., & Duguid, P. (1998, September). ‘Invention, innovation & organization’. *Organization Science*, 1–36.
- Bunning, C. (1992). Turning Experience into Learning: The strategic Challenge for Individuals and Organizations. *Journal of European Industrial Training, Bradford*, 16(6), 7–12. doi:10.1108/03090599210014980
- Burt, R. S. (1997). The contingent value of social capital. *Administrative Science Quarterly*, 42(2), 339–365. doi:10.2307/2393923
- Burt, R. S. (2000). The network structure of social capital. *Research in Organizational Behavior*, 22, 345–423. doi:10.1016/S0191-3085(00)22009-1
- Bushe, G. R. (2011). Appreciative inquiry: theory and critique. In D. Boje, B. Burnes, & J. Hassard (Eds.), *The Routledge Companion To Organizational Change* (pp. 87-103). Routledge.
- Bushe, G. R. (1995). Advances in appreciative inquiry as an organization development intervention. *Organization Development Journal*, 13, 14–14.
- Bushe, G. R. (2007). Appreciative inquiry is not about the positive. *OD Practitioner*, 39(4), 33–38.
- CAA. (2002). *CAP 719: Fundamental Human Factor Concepts*. Retrieved from <https://publicapps.caa.co.uk/docs/33/CAP719.PDF>

Compilation of References

- CAA. (2011). *Human Factors review, Phase two report: Safety Regulation Group*. Retrieved from <http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=4765>
- CAA. (2013). *Global risk picture, a briefing from the Civil Aviation Authority*. Retrieved from [https://publicapps.caa.co.uk/docs/33/CAP%201076%20In%20Focus%20Global%20risk%20\(p\)](https://publicapps.caa.co.uk/docs/33/CAP%201076%20In%20Focus%20Global%20risk%20(p))
- CAA. (2014). EASA FTL combined document. Commission Regulation (EU) No.83/2014, UK.
- Cain, K., Shore, K., Weston, C., & Sanders, C. B. (2018). Knowledge mobilization as a tool of institutional governance: Exploring academics' perceptions of "going public". *Canadian Journal of Higher Education/Revue canadienne d'enseignement supérieur*, 48(2), 39-54.
- Cain, T. (2019). School-university links for evidence-informed practice. *Education in Science*, 9(2), 97. doi:10.3390/educsci9020097
- Cai, Y. (2017). From an analytical framework for understanding the innovation process in higher education to an emerging research field of innovations in higher education. *The Review of Higher Education*, 40(4), 585–616. doi:10.1353/rhe.2017.0023
- CALL. (2011). *Establishing a Lessons Learned Program: Observation, Insights and Lessons*. CALL.
- Campbell, C., Pollock, K., Briscoe, P., Carr-Harris, S., & Tuters, S. (2017). Developing a knowledge network for applied education research to mobilize evidence in and for educational practice. *Educational Research*, 59(2), 209–227. doi:10.1080/00131881.2017.1310364
- Cantore, S. P., & Cooperrider, D. L. (2013). Positive psychology and appreciative inquiry: The contribution of the literature to an understanding of the nature and process of change in organizations. *The Wiley-Blackwell handbook of the psychology of leadership, change, and organizational development*, 267-287.
- Carey, S., Lawson, B., & Krause, D. R. (2011). Social capital configuration, legal bonds and performance in buyer–supplier relationships. *Journal of Operations Management*, 29(4), 277–288. doi:10.1016/j.jom.2010.08.003
- Carlucci, D., Marr, B., & Schiuma, G. (2004). The knowledge value chain: how intellectual capital impacts on business performance. *Int. J. Technology Management*, 27(6-7).
- Carty, R., & Walsh, S. (2007). The role of middle managers in knowledge transfer. *Journal of Information and Knowledge Management*, 6(4), 297–302. doi:10.1142/S021964920700186X
- Castellani, T., Valente, A., Cori, L., & Bianchi, F. (2016). Detecting the use of evidence in a meta-policy. *Evidence & Policy*, 12(1), 91–107. doi:10.1332/174426415X14430152798949
- Caulfield, T., & Ogbogu, U. (2015). The commercialization of university-based research: Balancing risks and benefits. *BMC Medical Ethics*, 16(70), 1–7. doi:10.1186/12910-015-0064-2 PMID:26464028

- Chandler, A. D. (1977). *The Visible Hand: The Managerial Revolution in American Business*. Cambridge: Harvard University Press.
- Chan, Y. E., & Farrington, C. J. (2018). Community-based research: Engaging universities in technology-related knowledge exchanges. *Information and Organization*, 28(3), 129–139. doi:10.1016/j.infoandorg.2018.08.001
- Checkland, P. (1985). Achieving desirable and feasible change: An application of soft systems methodology. *The Journal of the Operational Research Society*, 36(9), 821–831.
- Checkland, P. (2000). Soft systems methodology: A thirty-year retrospective. *Systems Research and Behavioral Science*, 17(S1), S11–S58. doi:10.1002/1099-1743(200011)17:1+<::AID-SRES374>3.0.CO;2-O
- Checkland, P., & Poulter, J. (2010). Soft Systems Methodology. In M. Reynolds & S. Holwell (Eds.), *Systems Approaches to Managing Change: A practical guide* (pp. 191–242). The Open University. doi:10.1007/978-1-84882-809-4_5
- Cheek, J., & Rudge, T. (1993). The power of normalisation: Foucauldian perspectives on contemporary Australian health care practices. *The Australian Journal of Social Issues*, 28(4), 271–284. doi:10.1002/j.1839-4655.1993.tb00928.x
- Cheili, E. (2012). *Learning organization: the case of a public organization (OAEE)* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 14735) (in Greek)
- Chen, H. M., Yuan, Y. H., Wu, C. H., & Dai, C. Y. (2017). Moderator effects of proactive knowledge transfer among knowledge transfer usefulness, management, and innovation: A study of knowledge innovation effective model construction. *International Journal of Knowledge Management*, 13(1), 16–33. doi:10.4018/IJKM.2017010102
- Chen, I. S., Chen, J. K., & Padró, F. F. (2017). Critical quality indicators of higher education. *Total Quality Management & Business Excellence*, 28(1-2), 130–146. doi:10.1080/14783363.2015.1050178
- Cherney, A. (2015). Academic–industry collaborations and knowledge co-production in the social sciences. *Journal of Sociology (Melbourne, Vic.)*, 51(4), 1003–1016. doi:10.1177/1440783313492237
- Cherney, A., Povey, J., Head, B., Boreham, P., & Ferguson, M. (2012). What influences the utilisation of educational research by policy-makers and practitioners? The perspectives of academic educational researchers. *International Journal of Educational Research*, 56, 23–34. doi:10.1016/j.ijer.2012.08.001
- Choi, B., Poon, S. K., & Davis, J. G. (2008). Effects of knowledge management strategy on organizational performance: A complementarity theory-based approach. *Omega*, 36(2), 235–251. doi:10.1016/j.omega.2006.06.007

Compilation of References

- Choi, S. Y., Lee, H., & Yoo, Y. (2010). The impact of information technology and transactive memory systems on knowledge sharing, application, and team performance: A field study. *Management Information Systems Quarterly*, 34(4), 855–870. doi:10.2307/25750708
- Choi, T. Y., & Kim, Y. (2008). Structural embeddedness and supplier management: A network perspective. *The Journal of Supply Chain Management*, 44(4), 5–13. doi:10.1111/j.1745-493X.2008.00069.x
- Choi, Y. (2016). The impact of social capital on employees' knowledge-sharing behavior: An empirical analysis of US federal agencies. *Public Performance & Management Review*, 39(2), 381–405. doi:10.1080/15309576.2015.1108795
- Chopra, M., Gupta, V., & Chhabra, B. (2017). Strategic Management Using Balanced Scorecard—A Case Study on Tata Power. *South Asian Journal of Business and Management Cases*, 6(2), 176–190. doi:10.1177/2277977917730446
- Chourides, P., Longbottom, D., & Murphy, W. (2003). *Excellence in Knowledge management: an empirical study to identify critical factors and performance measures*. Academic Press.
- Choy, S. O., & Ng, K. C. (2007). Implementing wiki software for supplementing online learning. *Australasian Journal of Educational Technology*, 23(2). doi:10.14742/ajet.1265
- Cioffi, C., Dalessio, A., & Gomez-Paloma, F. (2016). From knowledge to competence: The process of converting theory-practice. *Knowledge Cultures*, 1(6), 87–91.
- Cleland, D. I. (1985). A strategy for ongoing project evaluation. *Project Management Journal*, XVI(3), 11–17.
- Clinton, V., Oster, J. Jr, & Zorn, C. K. (2013). Analysing aviation safety: Problems, challenges, opportunities. *Research in Transportation Economics*, 43(1), 148–164. doi:10.1016/j.retrec.2012.12.001
- Coghlan, A. T., Preskill, H., & Tzavaras Catsambas, T. (2003). An overview of appreciative inquiry in evaluation. *New Directions for Evaluation*, 2003(100), 5–22. doi:10.1002/ev.96
- Coghlan, D., & Brannick, T. (2005). Foundations. In D. Coghlan & T. Brannick (Eds.), *Doing Action Research In Your Own Organisation* (2nd ed., pp. 3–20). London: SAGE.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95–S120. doi:10.1086/228943
- Collins, C. J., & Smith, K. G. (2006). Knowledge exchange and combination: The role of human resource practices in the performance of high-technology firms. *Academy of Management Journal*, 49(3), 544–560. doi:10.5465/amj.2006.21794671
- Colnar, S., & Dimovski, V. (2017). Knowledge management initiatives benefits for the Slovenian public sector. *Management*, 22(Special Issue), 145–161.

- Cong, X., & Pandya, K. V. (2003). Issues of knowledge management in the public sector. *Electronic Journal of Knowledge Management*, 1(2), 25–33.
- Conway, E., & Monks, K. (2011). Change from below: The role of middle managers in mediating paradoxical change. *Human Resource Management Journal*, 21(2), 190–203. doi:10.1111/j.1748-8583.2010.00135.x
- Cooper, A., Rodway, J., & Reid, R. (2018). Knowledge mobilization practices of educational researchers across Canada. *Canadian Journal of Higher Education/Revue canadienne d'enseignement supérieur*, 48(1), 1-21.
- Cooper, A. (2014). Knowledge mobilization intermediaries in education: A cross-case analysis of 44 Canadian organizations. *Evidence & Policy*, 10(1), 29–59. doi:10.1332/174426413X662806
- Cooper, A. (2017). How are educational researchers interacting with end-users to increase impact? *Engaged Scholar Journal: Community-Engaged Research, Teaching, and Learning*, 3(2), 99–122.
- Cooperrider, D. L., & Whitney, D. (2001). A positive revolution in change: Appreciative inquiry. *Public Administration and Public Policy*, 87, 611-630.
- Cooperrider, D. L., Whitney, D. K., & Stavros, J. M. (2003). *Appreciative inquiry handbook* (Vol. 1). Berrett-Koehler Publishers.
- Cooper, T. (2003). Critical management, critical systems theory and system dynamics. *Systemic Practice and Action Research*, 5(3), 237–249.
- Correspondent, S. (2014, June 6). *Pranab envisages varsity as breeding ground of creativity*. Retrieved June 11, 2019, from <https://www.thehindu.com/news/cities/kolkata/pranab-envisages-varsity-as-breeding-ground-of-creativity/article6088529.ece>
- Costanzo, L. A., & Tzoumpa, V. (2008). Enhancing organizational learning in teams: Has the middle manager got a role? *Team Performance Management*, 14(3/4), 146–164. doi:10.1108/13527590810883424
- Cousins, P. D., Handfield, R. B., Lawson, B., & Petersen, K. J. (2006). Creating supply chain relational capital: The impact of formal and informal socialization processes. *Journal of Operations Management*, 24(6), 851–863. doi:10.1016/j.jom.2005.08.007
- Cross, R., & Cummings, J. N. (2004). Tie and network correlates of individual performance in knowledge-intensive work. *Academy of Management Journal*, 47(6), 928–937.
- Cross, R., & Gray, P. (2013). Where has the time gone? Addressing collaboration overload in a networked economy. *California Management Review*, 56(1), 50–66. doi:10.1525/cmr.2013.56.1.50
- Cuthill, M., O’Shea, E., Wilson, B., & Viljoen, P. (2014). Universities and the public good: A review of knowledge exchange policy and related university practice in Australia. *Australian Universities Review*, 56(2), 36.

Compilation of References

- D'Este, P., Ramos-Vielba, I., Woolley, R., & Amara, N. (2018). How do researchers generate scientific and societal impacts? Toward an analytical and operational framework. *Science & Public Policy*, 45(6), 752–763. doi:10.1093/cipolcy023
- Daellenbach, H. G. (2001). Hard OR, soft OR, problem structuring methods, critical systems thinking: a primer. In *Proceedings of the ORSNZ Conference Twenty Naught One*. University of Canterbury.
- Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science*, 32(5), 554–571. doi:10.1287/mnsc.32.5.554
- Daft, R. L., Lengel, R. H., & Trevino, L. K. (1987). Message equivocality, media selection, and manager performance: Implications for information systems. *Management Information Systems Quarterly*, 11(3), 355–366. doi:10.2307/248682
- Davenport, T. H., & Prusak, L. (2004). *Working Knowledge: How Organizations Manage What They Know*. ACM: Ubiquity, 1-2.
- Davenport, T. H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Boston, MA: Harvard Business School Press.
- Davis, J., Subrahmanian, E., & Westerberg, A. (2005). Knowledge Management: Conceptual Foundations, Emerging Directions. In J. Davis, E. Subrahmanian, & A. Westerberg (Eds.), *Knowledge Management*. Physica-Verlag HD. doi:10.1007/3-7908-1618-3_1
- Dawes, S. S., Cresswell, A. M., & Pardo, T. A. (2009). From “Need to Know” to “Need to Share”: Tangled Problems, Information Boundaries, and the Building of Public Sector Knowledge Networks. *Public Administration Review*, 69(3), 392–402. doi:10.1111/j.1540-6210.2009.01987_2.x
- Debrincat, J., Bil, C., & Clark, G. (2010, September). Assessing organisational factors in aircraft accidents: methodologies and limitations. *Proc. 27th Congress of the International Council of the Aeronautical Sciences*.
- Dekker, S. W. A. (2002). *The field guide to human error investigations*. Ashgate.
- Delmestri, G., & Walgenbach, P. (2005). Mastering techniques or brokering knowledge? Middle managers in Germany, Great Britain and Italy. *Organization Studies*, 26(2), 197–220. doi:10.1177/0170840605049464
- Dennis, A. R., Fuller, R. M., & Valacich, J. S. (2008). Media, tasks, and communication processes: A theory of media synchronicity. *Management Information Systems Quarterly*, 32(3), 575–600. doi:10.2307/25148857
- dePaula, R., & Fischer, G. (2005). Knowledge Management: Why learning from the past is not enough! In J. Davis, E. Subrahmanian & A. Westerberg (Eds.), *Knowledge Management: Organizational and Technological Dimensions* (pp. 21-54). New York: Physica-Verlag Heidelberg.

- Dingsøy, T., & Conradi, R. (n.d.). *Knowledge Management Systems as a Feedback Mechanism in Software Development Processes: A Search for Success Criteria*. Norwegian University of Science and Technology (NTNU).
- Dirkx, J. M., & Lavin, R. (1991). *Understanding and Facilitating Experience-Based Learning in Adult Education: The FOURthought Model*. Midwest Research-to-Practice Conference, St. Paul, MN. Retrieved from <http://dirkx.wiki.educ.msu.edu/file/view/EBLRVS.91.pdf>
- Donne, V. (2012). Wiki: Using the web connections to connect students. *TechTrends*, 56(2), 31–36. doi:10.1007/11528-012-0561-9
- Driscoll, A., & Sandmann, L. R. (2016). From maverick to mainstream: The scholarship of engagement. *Journal of Higher Education Outreach & Engagement*, 20(1), 83–94.
- Drucker, P. (1995). *Managing in a time of Great Change*. Truman Talley/E.P. Dutton.
- Drucker, P. (1993). *Post-capitalist society*. Oxford: Butterworth Heinemann.
- Drucker, P. (1995). *Managing in a time of Great Change, Truman Talley/ E.P.* New York, NY: Dutton.
- Drucker, P. F., & Merino, M. I. (2000). *El Management del Siglo XXI*. Barcelona: Edhasa.
- Dubois, D., & Guyonnet, D. (2011). Risk-informed decision-making in the presence of epistemic uncertainty. *International Journal of General Systems*, 40(2), 145–167. doi:10.1080/03081079.2010.506179
- Duhon, B. (1998). It's all in our heads. *Inform (Silver Spring, Md.)*, 12(8), 8–13.
- EASA. (2009). *Guidance on Hazard Identification: Safety Management System and Safety Culture Working Group*. Retrieved from <https://www.easa.europa.eu/document-library/general-publications/ecast-guidance-hazards-identification>
- EASA. (2015). *Annual Safety Review 2014*. Retrieved from <http://asndata.aviation-safety.net/industry-reports/EASA-Annual-safety-review-2014.pdf>
- EASA. (2015a). *Action plan for the implementation of the Germanwings Task Force recommendations*. Retrieved from https://www.easa.europa.eu/download/various/GW_actionplan_final.pdf
- EASA. (2016). *Annual Safety Review 2016*. Retrieved from https://www.easa.europa.eu/system/files/dfu/209735_EASA_ASR_MAIN_REPORT.pdf
- ECA. (2013). *Flight plan to safety*. Retrieved from https://www.eurocockpit.be/sites/default/files/eca_flight_plan_to_safety_13_1204_f-web.pdf
- Economist. (2019). *Regulatory capture may be responsible for Boeing's recent problems*. Retrieved from <https://www.economist.com/business/2019/03/23/regulatory-capture-may-be-responsible-for-boeings-recent-problems>

Compilation of References

- Edelstein, H. (2016). Collaborative research partnerships for knowledge mobilisation. *Evidence & Policy: A Journal of Research, Debate and Practice*, 12(2), 199–216. doi:10.1332/174426415X14399903490979
- Edmondson, A. C. (2004). Learning from failure in health care: Frequent opportunities, pervasive barriers. *Quality & Safety in Health Care*, 13(Suppl. II), ii3–ii9. doi:10.1136/qshc.2003.009597 PMID:15576689
- Edwards, J. S. (2017). Knowledge sharing: At the heart of knowledge management. In P. Jain & N. Mnjama (Eds.), *Managing knowledge resources and records in modern organizations* (pp. 1–14). Hershey, PA: IGI Global. doi:10.4018/978-1-5225-1965-2.ch001
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532–550. doi:10.5465/amr.1989.4308385
- Ekambaram, A., & Jafocha, B. (2018). Inter-project knowledge sharing in public organizations. Case study of Norwegian and Polish municipalities. In *Proceedings of the 19th European Conference on Knowledge Management (ECKM 2018)*. University of Padua.
- Elgort, I. (2007). Using wikis as a learning tool in higher education. *ICT: Providing Choices for Learners and Learning, Proceedings ASCILITE Singapore*, 233-238.
- Englund, R. L., Graham, R. J., & Dinsmore, P. C. (2003). *Creating the Project Office. A Manager's Guide to Leading Organizational Change*. San Francisco: Jossey-Bass.
- Eppler. (2002). *Fighting Knowledge Fatigue The Role of Information Overload and Information Quality in KM Initiatives*. University of St. Gallen. Retrieved from www.knowledgemedia.org
- Erzikova, E. (2018). Gatekeeping. In R. L. Heath & W. Johansen (Eds.), *The International Encyclopedia of Strategic Communication* (pp. 1–6). Hoboken, NJ: John Wiley & Sons Limited. doi:10.1002/9781119010722.iesc0080
- Etzkowitz, H. (2008). *The Triple Helix: University-industry-government innovation in action*. London, UK: Routledge. doi:10.4324/9780203929605
- FAA. (2011, May). *Threat and error management and hazard identification on airports*. Paper presented at the Airports Conference, Washington, DC.
- Fan, J., Han, F., & Liu, H. (2014). Challenges of big data analysis. *National Science Review*, 1(2), 293–314. doi:10.1093/nsr/nwt032
- Faubert, B., Edelstein, H., & Qi, J. (2012). Understanding how organizations use the Internet to mobilise knowledge: Findings from the field of education. *International Journal of Management in Education, Special Issue — Knowledge Management in Higher Education*, 6(1-2), 1-21.
- Fauzi, M., Nya-Ling, C., Thursamy, R., & Ojo, A. (2019). Knowledge sharing. *VINE Journal of Information and Knowledge Management Systems*, 49(1), 136–159. doi:10.1108/VJKMS-09-2018-0074

- Fenwick, T. J., & Farrell, L. (2012). *Knowledge mobilization: Politics, languages, and responsibilities*. New York, NY: Routledge.
- Feuer, M. J. (2016). *The rising price of objectivity: Philanthropy, government, and the future of education research*. Cambridge, MA: Harvard Education Press.
- Fischman, G. E., Anderson, K. T., Tefera, A. A., & Zuiker, S. J. (2018). If mobilizing educational research is the answer, who can afford to ask the question? An analysis of faculty perspectives on knowledge mobilization for scholarship in education. *AERA Open*, 4(1). doi:10.1177/2332858417750133
- Floyd, S. W., & Wooldridge, B. (1996). *The Strategic Middle Manager: How to create and sustain competitive advantage*. San Francisco, California: Jossey-Bass publishers.
- Floyd, S. W., & Wooldridge, B. (1997). Middle managements strategic influence and organizational performance. *Journal of Management Studies*, 34(3), 465–485. doi:10.1111/1467-6486.00059
- Floyd, S. W., & Wooldridge, B. (2000). *Building strategy from the middle: Reconceptualizing strategy process*. Thousand Oaks, CA: Sage.
- Foucault, M. (2008). Panopticism “from” Discipline & Punish: The Birth of the Prison. *Race/ Ethnicity. Multidisciplinary Global Contexts*, 2(1), 1–12.
- Frank, H., & Landström, H. (2016). What makes entrepreneurship research interesting? Reflections on strategies to overcome the rigor–relevance gap. *Entrepreneurship and Regional Development*, 28(1-2), 51–75. doi:10.1080/08985626.2015.1100687
- Freeman, L. C. (1978). Centrality in social networks conceptual clarification. *Social Networks*, 1(3), 215–239. doi:10.1016/0378-8733(78)90021-7
- Friedkin, N. E. (1982). Information flow through strong and weak ties in intraorganizational social networks. *Social Networks*, 3(4), 273–285. doi:10.1016/0378-8733(82)90003-X
- Friehs, B. (2003). *Knowledge Management in Educational Settings*. In AARE/NZARE Conference on Educational Research, Risks & Dilemmas. Auckland, New Zealand.
- Fullwood, R., Rowley, J., & Delbridge, R. (2013). Knowledge sharing amongst academics in UK universities. *Journal of Knowledge Management*, 17(1), 123–136. doi:10.1108/13673271311300831
- Gaál, Z., Szabó, L., & Obermayer-Kovács, N., & Csepregi, A. (2012). Middle Managers’ Maturity of Knowledge Sharing: Investigation of Middle Managers Working at Medium- and Large-sized Enterprises. *Electronic Journal of Knowledge Management*, 10(1), 26–38.
- Gander, P., Hartley, L., Powell, D., Cabon, P., Hitchcock, E., Mills, A., & Popkin, S. (2011). Fatigue risk management: Organisational factors at the regulatory and industry/company level. *Accident; Analysis and Prevention*, 43(2), 573–590. doi:10.1016/j.aap.2009.11.007

Compilation of References

- García-Villaverde, P. M., Parra-Requena, G., & Molina-Morales, F. X. (2018). Structural social capital and knowledge acquisition: Implications of cluster membership. *Entrepreneurship and Regional Development*, 30(5-6), 530–561. doi:10.1080/08985626.2017.1407366
- Gardenfors, P., & Sahlin, N.-E. (1982). Unreliable probabilities, risk taking, and decision-making. *Synthese*, 53(1), 361–386. doi:10.1007/BF00486156
- Gasik, S. (2011). A model of project knowledge management. *Project Management Journal*, 42(3), 23–44. doi:10.1002/pmj.20239
- Gasik, S. (2014). Model zarządzania projektami publicznymi. *Kwartalnik Naukowy Uczelni Vistula*, 2(40), 32–33.
- Geisler, E. (2008). *Knowledge and knowledge systems*. Hershey, PA: IGI Publishing. doi:10.4018/978-1-59904-918-2
- Giles, D. E. Jr. (2016). Understanding an emerging field of scholarship: Toward a research agenda for engaged, public scholarship. *Journal of Higher Education Outreach & Engagement*, 20(1), 181–191.
- Gill, J., & Johnson, P. (2010). *Research Methods for Managers* (3rd ed.). London: SAGE.
- Girard, J. (2018). *Knowledge Management Matters. Words of wisdom from leading practitioners* (J. Girard & J. Girard, Eds.). Macon: Sagology.
- Goddard, A. (1998). Facing up to market forces. *Times Educational Supplement*, 13, 6–7.
- Goh, S. C. (2002). Managing effective knowledge transfer: An integrative framework and some practice implications. *Journal of Knowledge Management*, 6(1), 23–30. doi:10.1108/13673270210417664
- Grammatikou, E. (2018). *Knowledge management as a quality improvement tool in Urban planning services* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 21761) (in Greek)
- Granovetter, M. (1983). The strength of weak ties: A network theory revisited. *Sociological Theory*, 1(1), 201–233. doi:10.2307/202051
- Grau, F. X., Goddard, J., Hall, B. L., Hazelkorn, E., & Tandon, R. (2017). *Higher education in the world, towards a socially responsible university: Balancing the global with the local*. Barcelona, Spain: Girona Global University Network for Innovation.
- Gray, G. (2002). *Intellectual Capital Measurement State of the Field*. Cranfield School of Managements Centre for Business Performance.
- Gray. (2002). Measuring intellectual assets. *Centre for Business Performance*. Retrieved from www.cranfield.ac.uk/som/cbp/
- Green, W. G. (2008). *Hazards, Threats, Risk, Etc.* University of Pittsburgh.

- Griffin, R. W. (2012). *Fundamentals of management*. Mason: South-Western Cengage Learning.
- Grote, G. (2012). Safety management in different high-risk domains – All the same? *Safety Science*, 50(10), 1983–1922. doi:10.1016/j.ssci.2011.07.017
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105–117). Sage Publications.
- Guldenmund, F., Hale, H., Goossens, L., Betten, J., & Duijm, N. J. (2006). The development of an audit technique to assess the quality of safety barrier management. *Journal of Hazardous Materials*, 130(3), 234–241. doi:10.1016/j.jhazmat.2005.07.011
- Gunther-McGrath, R. (2001). Exploratory learning, innovative capacity and managerial oversight. *Academy of Management Journal*, 44(1), 118–131.
- Gupta, V., & Chopra, M. (2018). Gauging the impact of knowledge management practices on organizational performance – a balanced scorecard perspective. *VINE Journal of Information and Knowledge Management Systems*, 48(1), 21–46. doi:10.1108/VJKMS-07-2016-0038
- Gupta, V., & Jain, N. (2017). Harnessing information and communication technologies for effective knowledge creation: Shaping the future of education. *Journal of Enterprise Information Management*, 30(5), 831–855. doi:10.1108/JEIM-10-2016-0173
- Guzman, G. A. C., & Wilson, J. (2005). The ‘soft’ dimension of organizational knowledge transfer. *Journal of Knowledge Management*, 9(2), 59–74. doi:10.1108/13673270510590227
- Haas, A. (2015). Crowding at the frontier: Boundary spanners, gatekeepers and knowledge brokers. *Journal of Knowledge Management*, 19(5), 1029–1047. doi:10.1108/JKM-01-2015-0036
- Hadjimichael, M. (2009). A fuzzy expert system for aviation risk assessment. *Expert Systems with Applications*, 36(1), 6512–6519. doi:10.1016/j.eswa.2008.07.081
- Halbesleben, J. R. B., & Rathert, C. (2008). The role of continuous quality improvement and psychological safety in predicting work-arounds. *Health Care Management Review*, 33(2), 134–144. doi:10.1097/01.HMR.0000304505.04932.62 PMID:18360164
- Hallahan, K., Holtzhausen, D., Van Ruler, B., Verčič, D., & Sriramesh, K. (2007). Defining strategic communication. *International Journal of Strategic Communication*, 1(1), 3–35. doi:10.1080/15531180701285244
- Hall, B. L., Jackson, E. T., & Tandon, R. (Eds.). (2016). *Knowledge, democracy and action: Community-university research partnerships in global perspectives*. Oxford, UK: Oxford University Press. doi:10.7765/9781526137081
- Hall, H., Walsh, J., Greenwood, R., & Vodden, K. (2016). Advancing innovation in Newfoundland and Labrador: Insights for knowledge mobilization and university-community engagement. *Journal of Community Engagement and Scholarship*, 9(1), 19–30.

Compilation of References

- Haltiwanger, G., Landaeta, R. E., Pinto, C. A., & Tolk, A. (2010). Understanding the relationship between Risk Management and Knowledge Management: A literature review and extension. *International Journal of Knowledge Management Studies*, 4(3), 281–300. doi:10.1504/IJKMS.2010.038170
- Hanneman, R. A., & Riddle, M. (2005). *Introduction to social network methods*. Riverside, CA: University of California.
- Hansen, M. T. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly*, 44(1), 82–111. doi:10.2307/2667032
- Hansen, M. T. (2002). Knowledge networks: Explaining effective knowledge sharing in multiunit companies. *Organization Science*, 13(3), 232–248. doi:10.1287/orsc.13.3.232.2771
- Hardy, C., & Maguire, S. (2016). Organising risk: Discourse, power and “riskification”. *Academy of Management Review*, 41(1), 80–108. doi:10.5465/amr.2013.0106
- Harkavy, I., & Hartley, M. (2012). Integrating a commitment to the public good into the institutional fabric: Further lessons from the field. *Journal of Higher Education Outreach & Engagement*, 16(4), 17.
- Harris, D., & Li, W. C. (2011). An extension of the human factors analysis and classification system for use in open systems. *Theoretical Issues in Ergonomics Science*, 12(2), 108–128. doi:10.1080/14639220903536559
- Hatch, M. J. (2006). *Organization Theory*. Oxford.
- Hatvani, E. N. C. (2015). Risk analysis and risk management in the public sector and in public auditing. *Public Finance Quarterly*, 1(7), 7–28.
- Henttonen, K., Kianto, A., & Ritala, P. (2016). Knowledge sharing and individual work performance: An empirical study of a public sector organization. *Journal of Knowledge Management*, 20(4), 749–768. doi:10.1108/JKM-10-2015-0414
- Herrera, I. A., Nordskog, A. O., Myhre, G., & Halvorsen, K. (2009). Aviation safety and maintenance under major organisational changes, investigating non-existing accidents. *Accident; Analysis and Prevention*, 41(6), 1155–1163. doi:10.1016/j.aap.2008.06.007
- Higher Education in India: Vision 2030. (2013). *FICCI Higher Education Summit 2013*. EY and FICCI.
- Hilgartner, S. (1992). The Social construction of risk objects: or, how to pry open networks of risk. In J. F. Short & L. Clarke (Eds.), *Organizations, Uncertainties, and Risk*. Boulder, CO: Westview Press.
- Ho, L. A. (2008). What affects organizational performance? The linking of learning and knowledge management. *Industrial Management & Data Systems*, 108(9), 1234–1254. doi:10.1108/02635570810914919

- Hollnagel, E. (2006). The myth of human error in risk analysis and safety management. Industrial Safety Chair, École nationale supérieure des Mines de Paris Pôle Cindyniques, Sophia Antipolis, France.
- Hsin-Chieh, K. U. N. G., & Chi-Fang, L. I. U. (2018). Service learning and alumni-granted industry-academic collaborations. *Journal of Social and Administrative Sciences*, 5(3), 239–246.
- Hsu, Y. L., Li, W. C., & Chen, K. W. (2010). Structuring critical success factors of airline safety management system using a hybrid model. *Transportation Research Part E, Logistics and Transportation Review*, 46(2), 222–235. doi:10.1016/j.tre.2009.08.005
- Hult, G. T. M., Ketchen, D. J., & Slater, S. F. (2004). Information processing, knowledge development and strategic supply chain performance. *Academy of Management Journal*, 47(2), 241–253.
- Husted, K., & Michailova, S. (2002). Diagnosing and fighting knowledge-sharing hostility. *Organizational Dynamics*, 31(1), 60–73. doi:10.1016/S0090-2616(02)00072-4
- Huy, Q. N. (2001). In praise of middle managers. *Harvard Business Review*, 79(8), 73–79. PMID:11550632
- IATA. (2015). *Safety Report*. Retrieved from <https://www.iata.org/publications/Documents/iata-safety-report-2015.pdf>
- IATA. (2019). *Safety Report 2018*. Retrieved from <https://www.iata.org/publications/Pages/safety-report.aspx>
- Ibrahim, F. (2017). Knowledge management methodology: Developing a phenomenological Middle- range thinking approach for knowledge management research. *Journal of Management Research*, 9(4), 110–122. doi:10.5296/jmr.v9i4.10790
- ICAO. (2010). *Road to recovery*. Retrieved from https://www.icao.int/publications/DownloadButton/6502_en.pdf
- ICAO. (2013). *Safety Management Manual (SMM)* (3rd ed.). Montréal, Canada: International Civil Aviation Organization.
- Inkpen, A. C., & Tsang, E. W. (2005). Social capital, networks, and knowledge transfer. *Academy of Management Review*, 30(1), 146–165. doi:10.5465/amr.2005.15281445
- Inkpen, A. C., & Tsang, E. W. (2016). Reflections on the 2015 decade award - Social Capital, networks, and knowledge transfer: An emergent stream of research. *Academy of Management Review*, 41(4), 573–588. doi:10.5465/amr.2016.0140
- Interstate Aviation Committee. (2016). *Interim report: preliminary reference information on accident investigation, Boeing 737-800, A6-FDN*. Retrieved from [http://asndata.aviation-safety.net/reports/2016/20160319-0_B738_A6-FDN_\(Interim\).pdf](http://asndata.aviation-safety.net/reports/2016/20160319-0_B738_A6-FDN_(Interim).pdf)

Compilation of References

- Ion, G., Iftimescu, S., Proteasa, C., & Marin, E. (2019). Understanding the role, expectations, and challenges that policy-makers face in using educational research. *Education in Science*, 9(2), 81. doi:10.3390/educsci9020081
- Ion, G., & Iucu, R. (2014). Professionals' perceptions about the use of research in educational practice. *European Journal of Higher Education*, 4(4), 334–347. doi:10.1080/21568235.2014.899154
- Ion, G., Marin, E., & Proteasa, C. (2019). How does the context of research influence the use of educational research in policy-making and practice? *Educational Research for Policy and Practice*, 18(2), 119–139. doi:10.1007/10671-018-9236-4
- Ireland, R. (1992). Corporate Culture is Best Conveyed by Mid-level Managers. *Baylor Business Review*, 10(1), 18–19.
- Jain, N., & Gupta, V. (2019). The impact of knowledge management system on student performance: A case study of the University of Delhi. *VINE Journal of Information and Knowledge Management Systems*, 49(1), 115–135. doi:10.1108/VJIKMS-07-2018-0065
- Janczak, S. (2004). How middle managers integrate knowledge within projects. *Knowledge and Process Management*, 11(3), 210–224. doi:10.1002/kpm.207
- Jandaghi, G., Irani, H. R., Sadat, M. Z., & Maryam, D. (2014). Ranking the Knowledge Management Enablers Based on University Academic Members, Staff and Students Using AHP Method. *International Letters of Social and Humanistic Sciences*, 26, 7–13. doi:10.18052/www.scipress.com/ILSHS.26.7
- Janic, M. (2000). An assessment of risk and safety in civil aviation. *Journal of Air Transport Management*, 6(1), 43–50. doi:10.1016/S0969-6997(99)00021-6
- Jarvis, C. B. (1999). *Learning (or failing to learn) from experience: The dysfunctional implications of counterfactual thinking in reviewing past events to improve marketing performance* (Doctoral dissertation). Indiana University.
- Jashapara, A. (2011). *Knowledge Management An Integrated Approach*. New York: Prentice Hall.
- Johnson, K. L. (2015). *Organizational learning from information technology projects: A case study exploring lessons learned* (Doctoral dissertation). Capella University.
- Jonas, W. (2014). The strengths/limits of Systems Thinking denote the strengths/limits of Practice-Based Design Research. *FORMakademisk—Research Journal for Design and Design Education*, 7(4), 1-11.
- Jones, S., Procter, R., & Younie, S. (2015). Participatory knowledge mobilization: An emerging model for translational research in education. *Journal of Education for Teaching*, 41(5), 555–574. doi:10.1080/02607476.2015.1105540
- Kahn, B. K., Strong, D. M., & Wang, R. Y. (2002). Information quality benchmarks: Product and service performance. *Communications of the ACM*, 45(4), 184–192. doi:10.1145/505248.506007

- Kale, P., Singh, H., & Perlmutter, H. (2000). Learning and protection of proprietary assets in strategic alliances: Building relational capital. *Strategic Management Journal*, 21(3), 217–237. doi:10.1002/(SICI)1097-0266(200003)21:3<217::AID-SMJ95>3.0.CO;2-Y
- Kalling, T. (2003). Organization-internal transfer of knowledge and the role of motivation: A qualitative case study. *Knowledge and Process Management*, 10(2), 115–126. doi:10.1002/kpm.170
- Karamanavi, V. (2018). *Implementation practices' evaluation of knowledge management in the public sector* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 21828) (in Greek)
- Karaś, E., & Piasecka-Głuszak, A. (2013). Zarządzanie wiedzą- dlaczego tak ważne? *Nauki o zarządzaniu*, 4(17), 9-15.
- Karydi, A. (2010). *Knowledge management in public sector. The case of General Secretariat of Macedonia Thrace* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 13998) (in Greek)
- Kaše, R., Paauwe, J., & Zupan, N. (2009). HR practices, interpersonal relations, and intrafirm knowledge transfer in knowledge-intensive firms: A social network perspective. *Human Resource Management*, 48(4), 615–639. doi:10.1002/hrm.20301
- Kaweesi, M. (2018). Scholarly conceptions of the nature of academic research in universities: A literature review. [IJE]. *Interdisciplinary Journal of Education*, 1(2), 208–229.
- Kearney, R. C., & Berman, E. M. (2018). Introduction. In R. C. Kearney (Ed.), *Public sector performance: management, motivation, and measurement* (pp. 1–5). New York, NY: Routledge. doi:10.4324/9780429497964-1
- Kenny, J. (2017). Academic work and performativity. *Higher Education*, 74(5), 897–913. doi:10.1007/10734-016-0084-y
- Kerzner, H. (2017). Communications. In H. Kerzner (Ed.), *Project management. A systems Approach to Planning, Scheduling and Controlling* (pp. 2, 235–238). John Wiley & Sons.
- Kianto, A., Ritala, P., Spender, J.-C., & Vanhala, M. (2014). The interaction of intellectual capital assets and knowledge management practices in organizational value creation. *Journal of Intellectual Capital*, 15(3), 362–375. doi:10.1108/JIC-05-2014-0059
- Kim, H., & Gong, Y. (2009). The roles of tacit knowledge and OCB in the relationship between group-based pay and firm performance. *Human Resource Management Journal*, 19(2), 120–139. doi:10.1111/j.1748-8583.2009.00093.x
- King, W. R. (2009). Knowledge Management and Organizational Learning. In W. R. King (Ed.), *Knowledge Management and Organizational Learning*. Boston: Springer. doi:10.1007/978-1-4419-0011-1_1

Compilation of References

Klein, S. S., & Gwaltney, M. K. (1991). Charting the education dissemination system: Where we are and where we go from here. *Knowledge (Beverly Hills, Calif.)*, 12(3), 241–265. doi:10.1177/107554709101200304

Klincewicz, K. (2004). *Knowledge Management, development, diffusion and rejection*. Warszawa: Wydawnictwo Naukowe Wydział Zarządzania Uniwersytetu Warszawskiego.

Klinke, A., & Renn, O. (2002). A new approach to risk evaluation and management: Risk-based, precaution-based, and discourse-based strategies. *Risk Analysis*, 22(6), 1071–1094. doi:10.1111/1539-6924.00274

Knibbs, K., Underwood, J., MacDonald, M., Schoenfeld, B., Lavoie-Tremblay, M., Crea-Arsenio, M., ... Ehrlich, A. (2010). Appreciative inquiry: A strength-based research approach to building Canadian public health nursing capacity. *Journal of Research in Nursing*, 17(5), 484–494. doi:10.1177/1744987110387472

KPMG. (2003). *Insights from KPMG's European knowledge management survey 2002/2003*. Author.

Kraut, I., Pedigo, P. R., McKenna, D. D., & Dunnette, M. D. (2005, November). The role of the manager: What's really important in different management jobs. *The Academy of Management Executive*, 19(4), 122–129. doi:10.5465/ame.2005.19417914

Kroll, A., & Tantardini, M. (2019). Motivating and retaining government employees: The role of organizational social capital. *International Public Management Journal*, 22(2), 232–253. doi:10.1080/10967494.2017.1367341

Kyvik, S. (2013). The academic researcher role: Enhancing expectations and improved performance. *Higher Education*, 65(4), 525–538. doi:10.1007/10734-012-9561-0

Landri, P. (2012). Multiple enactments of educational research. *European Educational Research Journal*, 11(1), 62–67. doi:10.2304/eeerj.2012.11.1.62

Lane, K. E., Lemoine, P. A., Tinney, T. M., & Richardson, M. D. (2014). Modify and adapt: Global higher education in a changing economy. *International Journal of Innovation in the Digital Economy*, 5(2), 26–38. doi:10.4018/ijide.2014040103

Lee, D. Y., & Lehto, M. R. (2013). User acceptance of YouTube for procedural learning: An extension of the technology acceptance model. *Computers & Education*, 61, 193–208. doi:10.1016/j.compedu.2012.10.001

Lee, Y. W., Strong, D. M., Kahn, B. K., & Wang, R. Y. (2002). AIMQ: A methodology for information quality assessment. *Information & Management*, 40(2), 133–146. doi:10.1016/S0378-7206(02)00043-5

Leischow, S. J., Best, A., Trochim, W. M., Clark, P. I., Gallagher, R. S., Marcus, S. E., & Matthews, E. (2008). Systems thinking to improve the public's health. *American Journal of Preventive Medicine*, 35(2), 196–203. doi:10.1016/j.amepre.2008.05.014

- Lelic, S. (2001). Creating a knowledge sharing culture. *Knowledge Management*, 4(5), 6–9.
- Lemoine, P. A., Hackett, P. T., & Richardson, M. D. (2016). Higher education at a crossroads: Accountability, globalism and technology. In W. Nuninger & J.-M. Chatelet (Eds.), *Handbook of research on quality assurance and value management in higher education* (pp. 27–57). Hershey, PA: IGI. doi:10.4018/978-1-5225-0024-7.ch002
- Levac, L., Parizeau, K., Varghese, J., Morton, M., Jackson, E., & Hawkins, L. (2018). Towards a framework for building community-university resilience research agendas. *Social Sciences*, 7(12), 260. doi:10.3390/ocsci7120260
- Leveson, N. (2003). A new accident model for engineering safety systems. *Safety Science*, 42(4), 237–270. doi:10.1016/S0925-7535(03)00047-X
- Levin, B. (2013). To know is not enough: Research knowledge and its use. *Review of Education*, 1(1), 2–31. doi:10.1002/rev3.3001
- Levin, B., & Qi, J. (2013). Introduction and synthesis. In B. Levin, J. Qi, H. Edelstein, & J. Sohn (Eds.), *Mobilizing research knowledge: International perspectives*. Bristol, UK: Policy Press.
- Levin, D. Z., & Cross, R. (2004). The strength of weak ties you can trust: The mediating role of trust in effective knowledge transfer. *Management Science*, 50(11), 1477–1490. doi:10.1287/mnsc.1030.0136
- Levy, M. (2017). *A Holistic Approach to Lessons Learned: How Organizations Can Benefit from Their Own Knowledge*. CRC Press. doi:10.1201/9781351235549
- Leydesdorff, L. (2003). The mutual information of university-industry-government relations: An indicator of the Triple Helix dynamics. *Scientometrics*, 58(2), 445–467. doi:10.1023/A:1026253130577
- Lightowler, C., Stocks-Rankin, C. R., & Wilkinson, H. (2018). How practitioner-led research could have greater impact: The importance of considering knowledge mobilisation holistically. *Evidence & Policy: A Journal of Research. Debate and Practice*, 14(4), 641–663. doi:10.1332/174426417X14987303892424
- Li, M. Z., & Ryerson, M. S. (2019). Reviewing the DATAS of aviation research data: Diversity, availability, tractability, applicability, and sources. *Journal of Air Transport Management*, 75(1), 111–130. doi:10.1016/j.jairtraman.2018.12.004
- Lin, N. (2008). A network theory of social capital. In D. Castiglione, J. W. Van Deth, & G. Wolleb (Eds.), *The handbook of social capital* (pp. 50–69). London: Oxford University Press.
- Lin, N. (2017). Building a network theory of social capital. In N. Lin, K. S. Cook, & R. S. Burt (Eds.), *Social capital: Theory and research* (pp. 3–28). London: Taylor & Francis Group. doi:10.4324/9781315129457-1

Compilation of References

- Li, W.-C., Harris, D., & Yu, C.-S. (2007). Routes to failure: Analysis of 41 civil aviation accidents from the Republic of China using the human factors analysis and classification system. *Accident; Analysis and Prevention*, 40(2), 426–434. doi:10.1016/j.aap.2007.07.011
- Loebbecke, C., van Fenema, P. C., & Powell, P. (2016). Managing inter-organizational knowledge sharing. *The Journal of Strategic Information Systems*, 25(1), 4–14. doi:10.1016/j.jsis.2015.12.002
- Losh, E. (2011). YouTube pedagogy finding communities of practice in a distributed learning world. *Learning through Digital Media Experiments in Technology and Pedagogy*.
- Loukopoulos, L. D., & Dismukes, R. K. (2002). *Human error in aviation operations: ideas for the transfusion medicine area*. Human Factors Division, NASA Ames Research Center.
- Luxhøj, J. T., & Maurino, M. (2001). An aviation system risk model (ASRM) case study: Air Ontario 1363. *The Rutgers Scholar*, 1.
- Lyons, Acsente, D., & van Waesberghe, M. (2008). Integrating knowledge management and quality management to sustain knowledge enabled excellence in performance. *Vine*, 38(2), 241–253. doi:10.1108/03055720810889879
- MacDonald, C. (2012). Understanding Participatory Action Research: A qualitative research methodology option. *The Canadian Journal of Action Research*, 13(2), 1–11.
- MacKenzie, C. A., Christensen, J., & Turner, S. (2015). Advocating beyond the academy: Dilemmas of communicating relevant research results. *Qualitative Research*, 15(1), 105–121. doi:10.1177/1468794113509261
- Madge, O.-L. (2012). Creating a Culture of Learning and Knowledge Sharing in Libraries and Information Service. In H. T. Hou (Ed.), *New Research on Knowledge Management Models and Methods* (pp. 247-256). Rijeka: In Tech.
- Marais, K., Dulac, N., & Leveson, N. (2004, March). Beyond normal accidents and high reliability organizations: The need for an alternative approach to safety in complex systems. In *Engineering Systems Division Symposium* (pp. 1-16). MIT.
- Marr, B., Gupta, O., Pike, S., & Roos, G. È. (2003). Intellectual capital and knowledge management effectiveness. *Management Decision*, 41(8), 771–781. doi:10.1108/00251740310496288
- Marr, B., & Spender, J.-C. (2004). Measuring Knowledge assets-implications of the knowledge economy for performance measurement. *Measuring Business Excellence*.
- Matapa, E. (2017). *Knowledge management in nursing services- the case of a public hospital* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 20879) (in Greek)
- Mattessich, P. W., & Monsey, B. R. (1992). *Collaboration: what makes it work. A review of research literature on factors influencing successful collaboration*. Saint Paul, MN: Amherst H. Wilder Foundation.

- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20(3), 709–734. doi:10.5465/amr.1995.9508080335
- Mazur, S. (2013). *Zarządzanie wiedzą w organizacjach publicznych*. Warszawa: Wydawnictwo Naukowe SCHOLAR.
- McAdam, R., & Reid, R. (2000). A comparison of public and private sector perceptions and use of knowledge management. *Journal of European Industrial Training*, 24(6), 317–329. doi:10.1108/03090590010346424
- McElroy, M. W. (1999). *The Knowledge Life Cycle An Executable Model For The Enterprise. Proceedings of the Miami ICM Conference on Knowledge Management*.
- McNall, M. A., Barnes-Najor, J. V., Brown, R. E., Doberneck, D. M., & Fitzgerald, H. E. (2015). Systemic engagement: Universities as partners in systemic approaches to community change. *Journal of Higher Education Outreach & Engagement*, 19(1), 7–32.
- Meadows, D. H. (1980). The Unavoidable A Priori. In J. Randers (Ed.), *Elements of the System Dynamics Method* (pp. 23–56). Springer.
- Mense, E. G., Lemoine, P. A., Garretson, C. J., & Richardson, M. D. (2018). The development of global higher education in a world of transformation. *Journal of Education and Development*, 2(3), 47. doi:10.20849/jed.v2i3.529
- Mertins, K., Heisig, P., & Vorbeck, J. (2001). *Knowledge Management: Best Practices in Europe*. Springer. doi:10.1007/978-3-662-04466-7
- MHRD. (2016). *About Department of Higher Education*. Retrieved from mhrd.gov.in/overview
- MHRD. (2018). *All India Survey on Higher Education 2017-18*. Department of Higher Education, Ministry of Human Resource Development, Government of India, New Delhi. Retrieved as on 24.5.2019 from https://mhrd.gov.in/sites/upload_files/mhrd/files/statistics-new/AISHE2017-18.pdf
- Michael, S. (2005). The promise of appreciative inquiry as an interview tool for field research. *Development in Practice*, 15(2), 222–230. doi:10.1080/09614520500042094
- Michels, N. (2018). ‘Value-in’ partnership: Common ground and difference in university knowledge transfer policy and research. *International Journal of Technology Management & Sustainable Development*, 17(3), 203–225. doi:10.1386/tmsd.17.3.203_1
- Middleton, A. T., & Whitmore, E. (2017). Information into knowledge: Navigating the complexity in the campus community engagement context. *Evidence & Policy: A Journal of Research, Debate and Practice*, 13(3), 455–476. doi:10.1332/174426416X14614935571225
- Mingers, J. (1997). *Multimethodology*. Wiley Encyclopedia of Operations Research and Management Science.

Compilation of References

- Mingers, J., & Brocklesby, J. (1997). Multimethodology: Towards a framework of mixing methodologies. *International Journal of Management Sciences*, 25(5), 489–509. doi:10.1016/S0305-0483(97)00018-2
- Miozzo, M., Desyllas, P., Lee, H. F., & Miles, I. (2016). Innovation collaboration and appropriability by knowledge-intensive business services firms. *Research Policy*, 45(7), 1337–1351. doi:10.1016/j.respol.2016.03.018
- Mittal, S. (2018). Barriers to communication. *International Journal of Advanced Research and Development*, 3(1), 243–245.
- Mohr, J. J., & Sohi, R. S. (1995). Communication flows in distribution channels: Impact on assessments of communication quality and satisfaction. *Journal of Retailing*, 71(4), 393–415. doi:10.1016/0022-4359(95)90020-9
- Mokyr, J. (2002). *The gifts of Athena: historical origins of the knowledge economy*. Princeton, NJ: Princeton University Press.
- Monge, P. R., & Contractor, N. S. (2001). Emergence of communication networks. In F. Jablin & L. Putnam (Eds.), *The new handbook of organizational communication: Advances in theory, research, and methods* (pp. 440–502). Thousand Oaks, CA: SAGE Publications, Inc. doi:10.4135/9781412986243.n12
- Monge, P. R., & Contractor, N. S. (2003). *Theories of communication networks*. Oxford: Oxford University Press.
- Morgan, B. (2014). Income for outcome: Australia and New Zealand are experimenting with ways of assessing the impact of publicly funded research. *Nature*, 511, S72–S75. doi:10.1038/511S72a PMID:25054855
- Morton, S. (2015). Progressing research impact assessment: A ‘contributions’ approach. *Research Evaluation*, 24(4), 405–419. doi:10.1093/reseval/rvv016
- Mosher, J., Anucha, U., Appiah, H., & Levesque, S. (2014). From research to action: Four theories and their implications for knowledge mobilization. *Scholarly and Research Communication*, 5(4), 1–17. doi:10.22230/rc.2014v5n3a161
- Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23(2), 242–266. doi:10.5465/amr.1998.533225
- Naidorf, J. C. (2014). Knowledge utility: From social relevance to knowledge mobilization. *Education Policy Analysis Archives*, 22(89).
- Ndlela, M. N. (2014). Critical success factors for effective knowledge sharing: Integrating intra-organizational communication and KM tools. In *European Conference on Knowledge Management* (vol. 2, p. 724). Sonning Common: Academic Conferences International Limited.
- Nelson, I. A., London, R. A., & Strobel, K. R. (2015). Reinventing the role of the university researcher. *Educational Researcher*, 44(1), 17–26. doi:10.3102/0013189X15570387

- Nemati-Anaraki, L. (2015). Infrastructures of Knowledge Sharing Countrywide. In *Handbook of Research on Effective Project Management through the Integration of Knowledge and Innovation* (p. 429). Hershey, PA: IGI Global.
- Neumann, B. (2002). *The Knowledge Management Forum*. Academic Press.
- Nichols, N., Gaetz, S., & Phipps, D. (2015). Generating social change through community–campus collaboration. *Journal of Higher Education Outreach & Engagement*, 19(3), 7–32.
- Nichols, N., Phipps, D. J., Provençal, J., & Hewitt, A. (2013). Knowledge mobilization, collaboration, and social innovation: Leveraging investments in higher education. *Canadian Journal of Nonprofit and Social Economy Research*, 4(1), 25–42. doi:10.22230/cjnser.2013v4n1a126
- Niles, M. C. (2002). On the Hijacking of Agencies (and Airplanes): The Federal Aviation Administration, Agency Capture, and Airline Security. *Am. UJ Gender Soc. Pol’y & L.*, 10, 381.
- Nonaka, I., & Takeuchi, H. (1995). *The Knowledge Creating Company*. Oxford University Press.
- Nonaka, I., & Takeuchi, H. (2004). Theory of organizational knowledge creation. In Hitotsubashi on Knowledge Management. John Wiley & Sons (Asia) Pte Ltd.
- Nonaka, I. (1991). The knowledge-creating company. *Harvard Business Review*, 69, 96–104.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14–37. doi:10.1287/orsc.5.1.14
- Nonaka, I., & Takeuchi, H. (1995). *The Knowledge Creating Company*. Oxford University Press.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.
- North, K., & Kumta, G. (2018). Knowledge Management: Value Creation Through Organizational Learning. In K. North & G. Kumta (Eds.), *Knowledge Management: Value Creation Through Organizational Learning* (pp. 12–19). Cham: Springer. doi:10.1007/978-3-319-59978-6
- NTSB. (2010). *Loss of Control on Approach, Colgan Air, Inc., Operating as Continental Connection Flight 3407, Bombardier DHC-8-400, N200WQ, Clarence Center, New York, February 12, 2009*. Retrieved from <https://www.nts.gov/investigations/AccidentReports/Reports/AAR1001.pdf>
- NTSB. (2014). *Board Meeting Title: Crash of Asiana Flight 214 Accident Report Summary*. Retrieved from https://www.nts.gov/news/events/Pages/2014_Asiana_BMG-Abstract.aspx
- Nutley, S. M. (2013). Reflections on mobilising education research. In B. Levin (Ed.), *The impact of research in education: An international perspective*. Bristol, UK: The Policy Press.
- Nutley, S. M., Powell, A. E., & Davies, H. T. O. (2013). *What counts as good evidence?* London, UK: Alliance for Useful Evidence.
- Nutley, S., Walter, I., & Davies, H. T. O. (2007). *Using evidence: How research can inform public services*. Bristol, UK: Policy Press. doi:10.2307/j.ctt9qgw1

Compilation of References

- OECD. (2003). *Conclusions from the results of the survey of Knowledge Management Practices for Ministries/Departments/Agencies of Central Government in OECD Member Countries*. OECD.
- OECD. (2011). *Greece: Review of the Central Administration, OECD Public Governance Reviews*. OECD Publishing. Retrieved April 10, 2019 from https://www.oecd-ilibrary.org/governance/greece-review-of-the-central-administration_9789264102880-en
- Orr, K., & Jung, T. (2016). Co-producing knowledge and practice. In *Knowledge and practice in business and organisations* (pp. 221–235). New York, NY: Routledge. doi:10.4324/9781315674025
- Orús, C., Barlés, M. J., Belanche, D., Casaló, L., Fraj, E., & Gurrea, R. (2016). The effects of learner generated videos for YouTube on learning outcomes and satisfaction. *Computers & Education*, 95, 254–269. doi:10.1016/j.compedu.2016.01.007
- Osborne, S. P., Radnor, Z., & Nasi, G. (2012). A New Theory for Public Service Management? Toward a (Public) Service-Dominant Approach. *American Review of Public Administration*, 3–11.
- Oster, C. V., Strong, J. S., & Zorn, C. K. (1992). *Why airplanes crash: Aviation safety in a changing world*. Oxford University Press on Demand.
- Özdemir, V. (2018). Precision medicine goes global: How to get it right? Four ways to mobilize scientific knowledge. *OMICS: A Journal of Integrative Biology*, 22(8), 539–543. doi:10.1089/omi.2018.0104 PMID:30004300
- Pang, A., Shin, W., Lew, Z., & Walther, J. B. (2018). Building relationships through dialogic communication: Organizations, stakeholders, and computer-mediated communication. *Journal of Marketing Communications*, 24(1), 68–82. doi:10.1080/13527266.2016.1269019
- Pangil, F., & Nasurddin, A. M. (2013). Knowledge and the Importance of Knowledge Sharing in organizations. *Conference on Business Management Research* (pp. 3-7). Sintok: Universiti Utara Malaysia.
- Papaioannou, C. (2018). *Techniques and tools for dissemination and knowledge exchange, as a mechanism for effectiveness and efficiency in the provision of public service sector services: the case of the directorate of development and environment in the region of Central Macedonia* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 21824) (in Greek)
- Papanikou, M., & Veersma, U. (2012). Power relations and safety in commercial aviation: professional identity and occupational clashes. In S. J. Landry (Ed.), *Advances in Human Aspects of Aviation* (pp. 528–537). Taylor and Francis.
- Parent, R., Roy, M., & St-Jacques, D. (2007). A systems-based dynamic knowledge transfer capacity model. *Journal of Knowledge Management*, 11(6), 81–93. doi:10.1108/13673270710832181
- Park, J. C. (2009). Video allows young scientists new ways to be seen. *Learning and Leading with Technology*, 36(8), 34–35.

- Patton, M. Q. (1975). Alternative evaluation research paradigms. North Dakota Study Group on Evaluation, University of North Dakota.
- Paul. (2002). Knowledge Management in Enterprises – Journey to Building a sustainable Competitive Advantage. *Proceedings of the national Conference on Knowledge Management WARE*.
- Pee, L. G., & Kankanhalli, A. (2016). Interactions among factors influencing knowledge management in public-sector organizations: A resource-based view. *Government Information Quarterly*, 33(1), 188–199. doi:10.1016/j.giq.2015.06.002
- Peng, G. (2019). Co-membership, networks ties, and knowledge flow: An empirical investigation controlling for alternative mechanisms. *Decision Support Systems*, 118, 83–90. doi:10.1016/j.dss.2019.01.005
- Pérez-Lopez, S., & Alegre, J. (2012). Information technology competency, knowledge processes and firm performance. *Industrial Management & Data Systems*, 112(4), 644–662. doi:10.1108/02635571211225521
- Petrides, L.A., & Nodine, T.R. (2003). *Knowledge Management in Education: Defining the Landscape*. Institute for the Study of Knowledge Management in Education, Half Moon Bay.
- Pfeffer, J., & Sutton, R. I. (1999). Knowing ‘what’ to do is not enough: Turning knowledge into action. *California Management Review*, 42(1), 83–108. doi:10.2307/41166020
- Phillips, E., Berg, M. J., Rodriguez, C., & Damion, R. (2010). A Case Study of Participatory Action Research in a Public New England Middle School: Empowerment, Constraints and Challenges. *American Journal of Community Psychology*, 46(1-2), 179–183. doi:10.1007/10464-010-9336-7 PMID:20676753
- Phipps, D. J., Johnny, M., & Wedlock, J. (2015). An institutional process for brokering community-campus research collaborations. *Engaged Scholar Journal: Community-Engaged Research, Teaching, and Learning*, 1(1).
- Phipps, D. (2011). A report detailing the development of a university-based knowledge mobilization unit that enhances research outreach and engagement. *Scholarly Research and Communications*, 2(2), 1–13.
- Phipps, D., Cummings, J., Pepler, D., Craig, W., & Cardinal, S. (2016). The co-produced pathway to impact describes knowledge mobilization processes. *Journal of Community Engagement and Scholarship*, 9(1), 31–40.
- Pidd, M. (2004). *Systems modelling: theory and practice*. Wiley.
- Pieterse, W., & Ebbers, W. (2008). The use of service channels by citizens in the Netherlands: Implications for multi-channel management. *International Review of Administrative Sciences*, 74(1), 95–110. doi:10.1177/0020852307085736
- Podolny, J. M., & Baron, J. N. (1997). Resources and relationships: Social networks and mobility in the workplace. *American Sociological Review*, 62(5), 673–693. doi:10.2307/2657354

Compilation of References

- Polanyi, M. (1967). *The Tacit Knowledge Dimension*. London: Routledge & Kegan Paul.
- Power, M., Scheytt, T., Soin, K., & Sahlin, S. (2009). Reputational risk as a logic for organising in late modernity. *Organization Studies*, 30(2/3), 301–324. doi:10.1177/0170840608101482
- Prendergast, S., & Rickinson, M. (2019). Understanding school engagement in and with research. *Australian Educational Researcher*, 46(1), 17–39. doi:10.1007/13384-018-0292-9
- Probst, G., Raub, S., & Rombhardt, K. (2000). *Managing Knowledge*. Chichester: John Wiley & Sons.
- Protidou, S. (2019). *Good practices and Knowledge diffusion in OAED* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 22872) (in Greek)
- Psychogios, A. G., Alexandris, K., & Onofrei, A. (2008). Addressing individual and organisational factors influencing middle managers' synthesising role in knowledge creation and diffusion. *Int. Journal of Learning and Intellectual Capital*, 5(2), 208–222. doi:10.1504/IJLIC.2008.020152
- Pucciarelli, F., & Kaplan, A. (2016). Competition and strategy in higher education: Managing complexity and uncertainty. *Business Horizons*, 59(3), 311–320. doi:10.1016/j.bushor.2016.01.003
- Qi, J., & Levin, B. (2013). Assessing organizational efforts to mobilize research knowledge in education. *Education Policy Analysis Archives*, 21(2).
- Rajkumar, S. (2010). *Art of communication in project management*. In *PMI® Research Conference: Defining the Future of Project Management* (pp. 11–12). Washington, DC: Project Management Institute.
- Ramalingam, B. (2006). *Tools for knowledge and learning: A guide for development and humanitarian organisations*. London: Overseas Development Institute.
- Rasmussen, J., & Batstone, R. (1989). Why do complex organizational systems fail? World Bank Policy Planning and Research Staff, Environment Department.
- Rašula, J., Vukšić, V. B., & Štemberger, M. I. (2012). The impact of knowledge management on organizational performance. *Economic and Business Review*, 14(2), 147–168.
- Read, R., Cooper, A., Edelstein, H., Sohn, J., & Levin, B. (2013a). Mobilizing research knowledge: How universities share research knowledge. In B. Levin, J. Qi, H. Edelstein, & J. Sohn (Eds.), *The impact of research in education: An international perspective* (pp. 23–39). Bristol, UK: Policy Press.
- Read, R., Cooper, A., Edelstein, H., Sohn, J., & Levin, B. (2013b). Knowledge mobilization and utilization. In B. Levin, J. Qi, H. Edelstein, & J. Sohn (Eds.), *The impact of research in education: An international perspective* (pp. 65–84). Bristol, UK: The Policy Press.
- Reagans, R., & McEvily, B. (2003). Network structure and knowledge transfer: The effects of cohesion and range. *Administrative Science Quarterly*, 48(2), 240–267. doi:10.2307/3556658

Reason, J. (1993). The identification of latent organisational failures in complex systems. In J.A. Wise, V.D. Hopkin, & P. Stager (Eds.), *Verification and validation of complex systems: Human Factors Issues* (pp. 223-237). Springer-Verlag.

Reason, J. (1990). The contribution of latent human failures to the breakdown of complex systems. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 327(1241), 475–484.

Reason, J. (2004). *Managing the risks of organisational accidents*. Cleveland, OH: RMVC.

Reason, J., Parker, D., & Lawton, R. (1998). Organisational controls and safety: The varieties of rule-related behavior. *Journal of Occupational and Organizational Psychology*, 71(4), 289–304. doi:10.1111/j.2044-8325.1998.tb00678.x

Reddy, A. (2019, February 28). *India's Higher Education Needs a Paradigm Shift*. Retrieved May 24, 2019, from <https://thewire.in/education/indias-higher-education-needs-a-paradigm-shift>

Reed, J., Pearson, P., Douglas, B., & Wilding, H. (2002). Going home from hospital: an appreciative inquiry study. In S. Barrett, C. Komaromy, M. Robb, & A. Rogers (Eds.), *Communication relationships and care: a reader* (pp. 338–346). Routledge.

Regulatory Structure of Higher Education in India; Centre for Civil Society Submitted to International Growth Centre. (2015, February). Retrieved from <https://ccs.in/sites/default/files/research/policy-brief-regulatory-structure-higher-education.pdf>

Remawi, H., Bates, P., & Dix, I. (2011). The relationship between the implementation of a Safety Management System and the attitudes of employees towards unsafe acts in aviation. *Safety Science*, 49(5), 625–632. doi:10.1016/j.ssci.2010.09.014

Reynolds, M., & Holwell, S. (2010). Introducing systems approaches. In M. Reynolds & S. Holwell (Eds.), *Systems Approaches to Managing Change: A Practical Guide* (pp. 1–23). Springer. doi:10.1007/978-1-84882-809-4_1

Richards, G. S. (2004). *A multi-level examination of the role of middle management in developing absorptive capacity: towards a theory of knowledge utilization in organizations* (Unpublished doctoral dissertation). Carleton University, Canada.

Rickinson, M., de Bruin, C., Walsh, L., & Hall, M. (2017). What can evidence-use in practice learn from evidence-use in policy? *Educational Research*, 59(2), 173–189. doi:10.1080/00131881.2017.1304306

Rickinson, M., Walsh, L., De Bruin, K., & Hall, M. (2018). Understanding evidence use within education policy: A policy narrative perspective. *Evidence & Policy: A Journal of Research. Debate and Practice*, 15(2), 235–252. doi:10.1332/174426418X15172393826277

Riege, A. (2005). Three-dozen knowledge-sharing barriers managers must consider. *Journal of Knowledge Management*, 9(3), 18–35. doi:10.1108/13673270510602746

Compilation of References

- Riege, A., & Lindsay, N. (2006). Knowledge management in the public sector: Stakeholder partnerships in the public policy development. *Journal of Knowledge Management*, 10(3), 24–39. doi:10.1108/13673270610670830
- Roberts, K. H., & O'Reilly, C. A. (1974). Failures in upward communication in organizations: Three possible culprits. *Academy of Management Journal*, 17(2), 205–215.
- Roos, G., & Roos, J. (1997). Measuring your Company's Intellectual Performance. *Long Range Planning, Special Issue on Intellectual Capital*, 30(3), 413–426.
- Röpke, J. (2006). Knowledge mobilization and academic entrepreneurship. *Journal of Entrepreneurship Research*, 1(1), 33–61.
- Rossidis, I., & Aspridis, G. (2017). *Knowledge Management*. Athens: Stamoulis. (in Greek)
- Rosta, M. (2011). *What makes a New Public Management reform successful? An institutional analysis*. Budapest: ResearchGate. Retrieved from https://www.researchgate.net/publication/288670639_What_makes_a_New_Public_Management_reform_successful_An_institutional_analysis
- Rothblum, A. M., Wheal, D., Withington, S., Shappell, S. A., Wiegmann, D. A., Boehm, W., & Chaderjian, M. (2002). Human factors in incident investigation and analysis. *2nd International Workshop on Human Factors in Offshore Operations*.
- Rouleau, L. (2005). Micro-practices of strategic sensemaking and sensegiving: How middle managers interpret and sell change every day. *Journal of Management Studies*, 42(7), 1413–1441. doi:10.1111/j.1467-6486.2005.00549.x
- Rowell, L. (2017). Knowledge mobilization and action research in global contexts: Towards a comparative orientation. *Educational Action Research*, 25(3), 333–336. doi:10.1080/09650792.2017.1326759
- Rowell, L. L., & Hong, E. (2017). Knowledge democracy and action research: Pathways for the twenty-first century. In *The Palgrave international handbook of action research* (pp. 63–83). New York, NY: Palgrave Macmillan. doi:10.1057/978-1-137-40523-4_5
- Rowley, J. (2000). Is higher education ready for knowledge management? *International Journal of Educational Management*, 14(7), 325–333. doi:10.1108/09513540010378978
- Sağsan, M., Medeni, İ. T., & Medeni, T. D. (2016). Knowledge management paradigms: Implementation through individual fuzzy-based education. *Procedia Computer Science*, 102, 259–266. doi:10.1016/j.procs.2016.09.399
- Saha, B., & Srivastava, D. (2014, March). Data quality: The other face of big data. In *2014 IEEE 30th International Conference on Data Engineering* (pp. 1294-1297). IEEE.
- Sahlin, N.-E., & Persson, J. (1994). Epistemic risk: the significance of knowing what one does not know. In B. Brehmer & N.-E. Sahlin (Eds.), *Future risks and risk management* (pp. 37–62). Kluwer Academic Publishers. doi:10.1007/978-94-015-8388-6_2

- Sandhu, M., Kishore, K., & Umi, K. (2011). Knowledge sharing among public sector employees: Evidence from Malaysia. *International Journal of Public Sector Management*, 24(3), 206–226. doi:10.1108/09513551111121347
- Sandmann, L. R., Furco, A., & Adams, K. R. (2016). Building the field of higher education engagement: A 20-year retrospective. *Journal of Higher Education Outreach & Engagement*, 20(1), 1–14.
- Saufi, M., & Rosmaini, T. (2010). *Knowledge sharing practice in organization*. Retrieved from https://www.researchgate.net/publication/277997198_Knowledge_sharing_practice_in_organization
- Saunders, R., & Wheeler, T. (1991). *Handbook of safety management*. Pitman.
- Scanlan, J. (2018). A capability maturity framework for knowledge transfer. *Industry and Higher Education*, 32(4), 235–244. doi:10.1177/0950422218770335
- Schlesinger, L. A., & Oshry, B. (1984). Quality of Work Life and the Manager: Muddle in the Middle. *Organizational Dynamics*, 13(1), 5–19. doi:10.1016/0090-2616(84)90028-7
- Schramm, W. (1963). Communication Research in the United States. In W. Schramm (Ed.), *The Science of Human Communication. New Directions and New Findings in Communication Research* (pp. 1–16). New York, NY: Basic Books Inc.
- Schramm, W. (1971). The nature of communication between humans. In W. Schramm & D. F. Roberts (Eds.), *The process and effects of mass communication* (pp. 3–53). Urbana, IL: University of Illinois Press.
- Schulze-Cleven, T., & Olson, J. R. (2017). Worlds of higher education transformed: Toward varieties of academic capitalism. *Higher Education*, 73(6), 813–831. doi:10.1007/10734-017-0123-3
- Schwalbe, K. (2015). Planning communications management. In K. Schwalbe (Ed.), *Information technology project management* (8th ed., pp. 398–399). Boston, MA: Cengage Learning.
- Seeger, M. W. (2006). Best practices in crisis communication: An expert panel process. *Journal of Applied Communication Research*, 34(3), 232–244. doi:10.1080/00909880600769944
- Seidler-de Alwis, R., & Hartmann, E. (2008). The use of tacit knowledge within innovative companies: Knowledge management in innovative enterprises. *Journal of Knowledge Management*, 12(1), 133–134. doi:10.1108/13673270810852449
- Sethi, N. (2017). *India's demographic dividend to peak by 2020: economic Survey*. *Business Standard*. Available at: www.business-standard.com/budget/article/india-s-demographic-dividend-to-peak-by-2020-economic-survey-117013101013_1.html
- Sethi, D., & Seth, M. (2009). Interpersonal communication: Lifeblood of an organization. *The IUP Journal of Soft Skills*, 3(3), 32–40.

Compilation of References

Shannon, C. E. (1948). A mathematical theory of communication. *The Bell System Technical Journal*, 27, 379-423, 623-656.

Sheng, H., & Huang, P. S. (2005). Knowledge management and its relationship with TQM. *Total Quality Management*.

Shu-hsien, L. (2003). Knowledge management technologies and applications—Literature review from 1995 to 2002. *Expert Systems with Applications*, 25(2), 155–164. doi:10.1016/S0957-4174(03)00043-5

Silova, I., Read, R., Mundy, K., & Epstein, E. H. (2016). The mobilization of knowledge. In *Crafting a global field* (pp. 155–167). Cham, Switzerland: Springer. doi:10.1007/978-3-319-33186-7_9

Simon, K. H. (2009). Critical systems thinking. *Systems Science and Cybernetics*, II, 196–207.

Sinha, N., Kakkar, N. K., & Gupta, V. (2009). Unleash the power of creativity and innovation. *International Journal of Sustainable Strategic Management*, 1(4), 417–433. doi:10.1504/IJSSM.2009.030515

Sinha, N., Kakkar, N. K., & Gupta, V. (2012). Uncovering the secrets of the twenty-first-century organisation. *Global Business and Organizational Excellence*, 31(2), 49–56. doi:10.1002/joe.21414

Sinha, N., Kakkar, N. K., & Gupta, V. (2015). Harnessing the power of knowledge management for innovation. *International Journal of Knowledge and Learning*, 10(2), 124–146. doi:10.1504/IJKL.2015.071623

Skjong, R., & Wentworth, B. H. (2001). Expert judgment and risk perception. In *Eleventh International Offshore and Polar Engineering Conference*. International Society of Offshore and Polar Engineers.

Soin, K., & Scheytt, T. (2006). Making the case for narrative methods in cross-cultural organizational research. *Organizational Research Methods*, 9(1), 55–77. doi:10.1177/1094428105283297

Soo, C., Devinney, T., Midgley, D., & Deering, A. (2002). Knowledge management: Philosophy, processes, and pitfalls. *California Management Review*, 44(4), 129–150. doi:10.2307/41166146

Sotirakou, T., & Zeppou, M. (2005). How to align Greek civil service with European Union public sector management policies: A demanding role for HR managers in the contemporary public administration context. *International Journal of Public Sector Management*, 18(1), 54–82. doi:10.1108/09513550510576152

Speyer, J. (2004). *Example application of aircrew incident reporting system (AIRS)*. Retrieved from https://flightsafety.org/wp-content/uploads/2016/09/AIRS_application.pdf

Staehle, W., & Schirmer, F. (1992). Lower-level and Middle-level Managers as the Recipients and Actors of Human Resource Management. *International Studies of Management & Organization*, 22(1), 67–89. doi:10.1080/00208825.1992.11656576

- Stahl, B. C., Lichtenstein, Y., & Mangan, A. (2003). The limits of risk management: A social construction approach. *Communications of the International Information Management Association*, 3(3), 15–22.
- Stampellos, C. (2018). *Knowledge management in the public sector. Necessity or luxury? The contribution of knowledge management in the functioning of public administration. The case of the North Aegean region* (Master thesis). Available from Hellenicus Institutional Repository. (Identifier 1827) (in Greek)
- Stavrakidou, P. (2011). *Learning organizations in the health sector: the case of a hospital*. (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 14847) (in Greek)
- Steinruck, S. (2002). Using Knowledge Management to drive business: Organization and Solutions at the Siemens AG. *Proceedings of the Conference INSEAD*.
- Strier, R. (2014). Fields of paradox: University–community partnerships. *Higher Education*, 68(2), 155–165. doi:10.1007/10734-013-9698-5
- Stuart, I., McCutcheon, D., Handfield, R., McLachlin, R., & Samson, D. (2002). Effective case research in operations management: A process perspective. *Journal of Operations Management*, 20(5), 419–433. doi:10.1016/S0272-6963(02)00022-0
- Sulaiman, F., Ramayah, T., & Omar, A. (2010). *ICT Security Policy in a Higher Education Institution in Malaysia*. In *Handbook of Research on Information Communication Technology Policy: Trends, Issues and Advancements: Trends, Issues and Advancements* (p. 354). Hershey, PA: Information Science Reference.
- Suppiah, V., & Sandhu, M. S. (2011). Organisational culture's influence on tacit knowledge-sharing behavior. *Journal of Knowledge Management*, 15(3), 462–477. doi:10.1108/13673271111137439
- Syed-Ikhsan, S. O. S., & Rowland, F. (2004). Knowledge management in a public organization: A study on the relationship between organizational elements and the performance of knowledge transfer. *Journal of Knowledge Management*, 8(2), 95–111. doi:10.1108/13673270410529145
- Syed-Ikhsan, S., & Rowland, F. (2004b). Benchmarking knowledge management in a public organization in Malaysia. *Benchmarking*, 11(3), 238–266. doi:10.1108/14635770410538745
- Szulanski, G. (2000). The process of knowledge transfer: A diachronic analysis of stickiness. *Organizational Behavior and Human Decision Processes*, 82(1), 9–27. doi:10.1006/obhd.2000.2884
- Tantardini, M., & Kroll, A. (2015). The role of organizational social capital in performance management. *Public Performance & Management Review*, 39(1), 83–99. doi:10.1080/15309576.2016.1071163
- Thaw, D. (2014). Enlightened regulatory capture. *Washington Law Review (Seattle, Wash.)*, 89, 329.

Compilation of References

- Theocharis, S. A., & Tschritzis, G. A. (2016). Knowledge Management systems in the public sector: Critical issues. *Lecture Notes on Software Engineering*, 4(1), 59–65. doi:10.7763/LNSE.2016.V4.224
- Thomas, A., & Paul, J. (2019). Knowledge transfer and innovation through university-industry partnership: An integrated theoretical view. *Knowledge Management Research and Practice*, 17(4), 436–448. doi:10.1080/14778238.2018.1552485
- Togola, A., Ahmed, S., & Jadaan, T. (2019). Barriers of Knowledge Transfer between Globally Distributed Teams in ICT Product Development. *Proceedings of the 52nd Hawaii International Conference on System Sciences*. Retrieved March 3, 2019 from <http://hdl.handle.net/10125/59993>
- Törner, M. (2011). The ‘social-physiology’ of safety: An integrative approach to understanding organisational psychological mechanisms behind safety performance. *Safety Science*, 49(8), 1262–1269. doi:10.1016/j.ssci.2011.04.013
- Toyama, R., & Nonaka, I. (2015). The Knowledge-creating Theory Revisited: Knowledge Creation as a Synthesizing Process. In J. S. Edwards (Ed.), *The Essentials of Knowledge Management* (pp. 95–110). London: Palgrave Macmillan.
- Trifonova, A., & Ronchetti, M. (2006). Hoarding content for mobile learning. *International Journal of Mobile Communications*, 4(4), 459–47. doi:10.1504/IJMC.2006.008952
- Triglinaou, E. (2018). *Knowledge management in the public sector: an implementation proposal in judicial services* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 21856) (in Greek)
- Trist, E. (1981). *The evolution of socio-technical systems: a conceptual framework and an action research program*. Occasional Paper, No. 2.
- Trivella, L., & Nasiopoulos, K. D. (2015). Knowledge Management Strategy within Higher Education. The case of Greece. *Procedia - Social and Behavioral Sciences*, 175, 488–495.
- Tryon, E. A. (2018). Regional perspectives on learning by doing: Stories from engaged universities around the world. *Journal of Higher Education Outreach & Engagement*, 22(2), 237–242.
- Tsagkalidou, S. (2011). *Knowledge management in public administration* (Master thesis). Available from PSEPHEDA Digital Library and Institutional Repository. (Identifier 14243) (in Greek)
- Tsai, W., & Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of Management Journal*, 41(4), 464–476.
- Turner, N., & Tennant, S. J. (2010). As far as is reasonably practicable: Socially constructing risk, safety, and accidents in military operations. *Journal of Business Ethics*, 91(1), 21–33. doi:10.1007/10551-009-0065-5
- Tushman, M. L., & Katz, R. (1980). External communication and project performance: An investigation into the role of gatekeepers. *Management Science*, 26(11), 1071–1085. doi:10.1287/mnsc.26.11.1071

- Ulrich, W. (2003). Beyond methodology choice: Critical systems thinking as critically systemic discourse. *The Journal of the Operational Research Society*, 54(4), 325–342. doi:10.1057/palgrave.jors.2601518
- Underwood, P., & Waterson, P. (2013). Systemic accident analysis: Examining the gap between research and practice. *Accident; Analysis and Prevention*, 55, 154–164. doi:10.1016/j.aap.2013.02.041
- United Nations. (2018). *E-Government Survey 2018: Gearing E-Government to Support Transformation towards sustainable and resilient societies*. Retrieved from <https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2018>
- Uyterhoeven, H. (1989). General Managers in the Middle. *Harvard Business Review*, 67(5), 136–145. PMID:10295475
- Valentino, C. L. (2004). The role of middle managers in the transmission and integration of organizational culture. *Journal of Healthcare Management*, 49(6), 393–404. doi:10.1097/00115514-200411000-00009 PMID:15603115
- Van Eerd, D., & Saunders, R. (2017). Integrated knowledge transfer and exchange: An organizational approach for stakeholder engagement and communications. *Scholarly and Research Communication*, 8(1).
- Varey, R. J. (2000). A critical review of conceptions of communication evident in contemporary business and management literature. *Journal of Communication Management (London)*, 4(4), 328–340. doi:10.1108/eb023530
- Vila, L. E. (2019). The micro-macro interfaces of higher education, innovation, regional growth and regional development. In *New paths of entrepreneurship development* (pp. 141–166). Cham, Switzerland: Springer. doi:10.1007/978-3-319-96032-6_8
- Villena, V. H., Revilla, E., & Choi, T. Y. (2011). The dark side of buyer–supplier relationships: A social capital perspective. *Journal of Operations Management*, 29(6), 561–576. doi:10.1016/j.jom.2010.09.001
- von Zedtwitz, M. (2002). Organizational learning through post-project reviews in R&D. *R & D Management*, 32(3), 255–268. doi:10.1111/1467-9310.00258
- Voss, C., Tsiriktsis, N., & Frohlich, M. (2002). Case research in operations management. *International Journal of Operations & Production Management*, 22(2), 195–219. doi:10.1108/01443570210414329
- Wadhwa, R. (2016). New phase of internationalization of higher education and institutional change. *Higher Education for the Future*, 3(2), 227–246. doi:10.1177/2347631116650548
- Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications* (Vol. 8). Cambridge: Cambridge University Press. doi:10.1017/CBO9780511815478

Compilation of References

- Weber, R. O., & Aha, D. W. (2003). Intelligent delivery of military lessons learned. *Decision Support Systems*, 34(3), 287–304. doi:10.1016/S0167-9236(02)00122-7
- Weber, R., Aha, D. W., & Becerra-Fernandez, I. (2001). Intelligent Lessons Learned Systems. *Expert Systems with Applications*, 20(1), 17–34. doi:10.1016/S0957-4174(00)00046-4
- Weerts, D. J., & Sandmann, L. R. (2010). Community engagement and boundary-spanning roles at research universities. *The Journal of Higher Education*, 81(6), 632–657. doi:10.1080/00221546.2010.11779075
- Weiss, C. H. (1979). The many meanings of research utilization. *Public Administration Review*, 39(5), 426–431. doi:10.2307/3109916
- Wells, P. J. (2017). The role of higher education institutions today. In F. X. Grau, J. Goddard, B. L. Hall, E. Hazelkorn, & R. Tandon (Eds.), *Higher education in the world, towards a socially responsible university: Balancing the global with the local*. Barcelona, Spain: Girona Global University Network for Innovation.
- Westerberg, K., & Hjelte, J. (2014). The story of a knowledge-based and learning organization. *Nordic Journal of Social Research*, 5, 2–3. doi:10.7577/njsr.2072
- White, J. W. (2009). Coffy, YouTube, and uncle ben: The use of film and new media in the teaching of African American studies at the university of Hawaii. *New Media in Higher Education*, 42(1/2), 47–53.
- Whitney, D., & Cooperrider, D. L. (2000). The appreciative inquiry summit: An emerging methodology for whole system positive change. *OD Practitioner*, 32(1), 13–26.
- Wiegmann, D. A., & Shappell, S. A. (2001). Human error analysis of commercial aviation accidents: Application of the Human Factors Analysis and Classification System (HFACS). *Aviation, Space, and Environmental Medicine*, 72(11), 1006–1016.
- Wincher, D. (2013). *NASA's Aviation Safety Reporting System (ASRS): the voice of front-line employees*. Humans as the last barriers, European HRO Conference, Aix En Provence.
- Wirick, D. W. (2009). *Public-Sector Project Management*. Wiley & Sons. doi:10.1002/9780470549131
- Wise, J. A., Hopkin, V. D., & Garland, D. J. (2010). *Handbook of aviation human factors* (2nd ed.). CRC Press, Taylor & Francis Group.
- Wong, K. Y., & Aspinwall, E. (2005). An empirical study of the important factors for knowledge-management adoption in the SME sector. *Journal of Knowledge Management*, 9(3), 64–82. doi:10.1108/13673270510602773
- Wyrozębski, P. (2019). Biuro zarządzania projektami (PMO). In P. Wyrozębski (Ed.), *Biuro zarządzania projektami (PMO)* (pp. 151–164). Warszawa: Polskie Wydawnictwo Ekonomiczne.

- Yadav, R., Tiruwa, A., & Suri, P. K. (2017). Internet based learning (IBL) in higher education: A literature review. *Journal of International Education in Business*, 10(2), 102–129. doi:10.1108/JIEB-10-2016-0035
- Yahya, K. (2009). Power-influence in decision making, competence, and organizational culture in public organizations. *Journal of Public Administration: Research and Theory*, 19(2), 385–408. doi:10.1093/jopart/mun005
- Yang, B., Zheng, W., & Viere, C. (2009). Holistic Views of Knowledge Management Models. *Advances in Developing Human Resources*, 11(3), 273–289. doi:10.1177/1523422309338584
- Yang, D. (2011). The effect of knowledge management on product innovation: Evidence from the Chinese software outsourcing vendors. *IBusiness*, 3(1), 16–22. doi:10.4236/ib.2011.31003
- Yin, R. K. (1981). The case study as a serious research strategy. *Science Communication*, 3(1), 97–114.
- Yohalem, N., & Tseng, V. (2015). Commentary: Moving from practice to research, and back. *Applied Developmental Science*, 19(2), 117–120. doi:10.1080/10888691.2014.983033
- Yuan, C., Li, Y., Vlas, C. O., & Peng, M. W. (2018). Dynamic capabilities, subnational environment, and university technology transfer. *Strategic Organization*, 16(1), 35–60. doi:10.1177/1476127016667969
- Yuen, H. Y. (2007). Overview of Knowledge Management in the Public Sector. *7th Global Forum on Reinventing Government: Workshop on Building Trust in Government*. Retrieved on 16 Dec 2018 from <http://unpan1.un.org/intradoc/groups/public/documents/unpan/unpan026041.pdf>
- Zhang, A. Y., Tsui, A. S., Song, L. J., Li, C., & Jia, L. (2008). How do I trust thee? The employee-organization relationship, supervisory support, and middle manager trust in the organization. *Human Resource Management*, 47(1), 111–132. doi:10.1002/hrm.20200
- Zins, C. (2007). Conceptual approaches for defining data, information, and knowledge. *Journal of the American Society for Information Science and Technology*, 58(4), 479–493. doi:10.1002/asi.20508
- Zuiker, S. J., Piepgrass, N., Tefera, A., Anderson, K. T., Winn, K., & Fischman, G. (2017). Recognizing and transforming knowledge mobilization in colleges of education. *International Journal of Education Policy and Leadership*, 15(1). doi:10.22230/ijepl.2019v15n1a808
- Zupan, N., & Kaše, R. (2007). The role of HR actors in knowledge networks. *International Journal of Manpower*, 28(3/4), 243–259. doi:10.1108/01437720710755236

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Index

A

AAR 199-200, 204, 210, 219
 Accessibility 76-77, 79, 81-82, 85, 88-91, 93, 95-96, 152
 Accident 48-50, 52-53, 56, 74
 Action Plan 124, 126, 138, 144
 Action Research 123-127, 132, 138, 140, 144
 Appreciative Inquiry 60, 62
 Aviation 47-58, 61-63

B

Barrier 56, 74, 81, 103
 Best Practice-Experience 219
 Best Practices 39, 61, 132, 166, 199

C

Cognitive Capital 91
 Cognitive Social Capital 76, 78-80, 82, 84-85, 90-92, 95-96, 103
 Communication Noise 103
 Communication Plan 125, 130, 133, 144
 Critical Interpretivism 59-60, 62-63
 Cultural Institution 123

D

Data Mining 31, 46
 Debrief 201, 219
 Debriefing 196, 201, 204, 215, 219
 Decision Making 47, 51, 56-58, 60, 62, 173, 198-199, 214

E

E-government 77, 178, 182-183, 189
 Engagement 3, 7-9, 22, 27, 148, 152, 170
 Expert Tools 46
 Explicit Knowledge 110, 120, 129, 137, 144, 149

G

Gatekeeper 81, 83, 86, 103
 Gatekeeping 81, 85, 88-93, 95-96
 Global Higher Education 1-8, 10-11, 22
 Good Practice 3, 131, 144
 Greece 25, 77, 113, 183, 188
 Greek Organizations 105, 113, 115, 178-179, 186

H

Higher Education Institutions 2-3, 5, 7-8, 11, 145, 150

I

ICT 31-32, 46, 145-149, 151-154, 158, 161-163, 168-172, 178, 182, 185-186, 188-189
 Incident 56, 74
 Information 4, 6, 9, 23, 25-26, 29, 32-33, 36-37, 39-43, 46, 48, 51, 56-58, 61, 63, 76-96, 103, 106-108, 110-111, 120-121, 125-130, 134, 136-137, 144-145, 147-149, 161, 178-180, 182, 189, 193-194, 197-199, 210, 212

Index

Information and Communication Technologies Tools 149, 161
Intellectual Capital 5, 128, 148, 159, 170-171, 173

K

KM Practices 106, 112, 114, 120, 178-179, 183, 185-186, 189
KM Processes 114, 120
Knowledge Creation 2, 5, 27, 105-106, 109-110, 120, 149, 151-152, 157, 159, 171, 200
Knowledge Diffusion 109, 120, 183
Knowledge Dissemination 22, 32, 42, 151
Knowledge Management 3, 24-30, 32-38, 40, 42-44, 46-48, 51-53, 57-58, 60-63, 77, 105-106, 120-121, 123-126, 128, 130, 132-135, 138-140, 145-146, 148-149, 162, 165-166, 168, 178-179, 181, 194, 196, 203
Knowledge Management Practices 194
Knowledge Management Tools 32, 44, 145-146, 149, 162, 165-166, 168
Knowledge Mobilization 1-2, 4-6, 8-9, 11, 23
Knowledge Sharing 80, 82, 93-94, 109, 114, 123, 125, 129-132, 134-135, 137-140, 144-145, 149, 151, 158-159, 163, 165, 169-170, 172-173, 184, 186, 194, 199
Knowledge Transfer 2, 5, 7, 27, 80-81, 90, 94-95, 109-111, 114, 131, 172, 178, 183-184, 189, 194
Knowledgebase 219
Knowledge-Based Economy 1, 4, 23, 108

L

Learning Organization 185, 194
Lessons Learned 53, 132, 158, 162, 169, 196-204

M

Media Richness 103
Middle Managers 105-106, 113
Museum 123, 125-126, 130, 132-133, 136-138, 140

N

Network Analysis 76, 78, 83-84
Network Density 80, 84, 87, 104

O

Organizational Learning 32, 109, 149, 154, 158-159, 170-171, 194, 199

P

Paradigm 48, 53-55, 57-60, 74, 78-79, 127, 170
Project Management 30, 124-126, 128, 130, 132-137, 139
Project Management Office 134, 136, 139
Public Sector 24-26, 32, 47, 51, 76-80, 93-95, 109, 113, 124, 128, 131, 178-190

R

Relational Capital 78, 80, 85, 88-89, 96
Relational Social Capital 79-80, 82, 88-89, 95, 104

S

Safety Culture 49, 75
SMS 57-59, 75
Social Network 62, 79, 84, 104
Social Security Organization 78
Strategic KM 121
Structural Capital 78, 88, 93
Structural Social Capital 79, 82, 85, 93, 104

T

Tacit Knowledge 110, 120-121, 125, 129-131, 137, 139, 144, 148, 159, 163, 165, 199

W

Wisdom 53-54, 141