Knowledge Translation

WORKING METHODS FOR KNOWLEDGE MANAGEMENT

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Knowledge Translation in Practice

Introduction to the Series – Working Methods in Knowledge Management

Knowledge sciences as a discipline has a rich and diverse history dating back to the 1950s. In the past 70 years, the discipline has drawn theory and practice from economics, engineering, communications, learning sciences, technology, information sciences, psychology, social sciences, and business and organization management. To craft this discipline, we have developed our own language and terminologies, established our own peer-reviewed journals and built a rich research foundation, created a gray literature and established a series of networks and conferences. Over the decades there have been many knowledge management education programs, but there is no consistent curriculum and few have been sustained. It has been challenging for new practitioners to gain an understanding of the field. While the practice of knowledge management is growing around the world it has not yet achieved the expected organizational stature. For knowledge management to rise to the stature of other business functions and operations, it must be able to speak the language of business, align with and support the way the organization works.

This series is designed for business and knowledge management practitioners. Working Methods in Knowledge Management is a multi-year and multi-volume series designed to address each and all of the methods required to establish and sustain an organization-wide knowledge management function. The goal of the series is to provide a business perspective on each topic. Each book begins by grounding the method in the business context – then translates established business models and methods to a knowledge management context. It is often the case that this translation expands and extends the business model and method.

The knowledge management literature is rich with introductory handbooks, guidebooks, cookbooks, toolkits and practical introductions. This literature is an important starting point for anyone new to the discipline. We recommend any and all of these books as a way to build a fundamental understanding of the scope and coverage of the field. These texts will provide a good 10- to 20-page introduction to all of the key issues you need to be aware of as you embark on a new career in the field or have been assigned a new knowledge management role or responsibility. Once you have that grounding, though, we recommend that you look to the Working Methods in Knowledge Management texts as an intermediate source for understanding "What comes next? What now?"

Just as this series is not intended as a starting point for the field, neither it is an ending point. Each text is designed to support practical application, and to foster a broader discussion of practice. It is through practical application and extended discussion that we will advance theory and research. The editors anticipate that as practice expands, there will be a need to update the texts – based on what we are learning. Furthermore, the editors hope the texts are written in a way that allows business managers to extend their work to include knowledge management functions and assets. We will learn most from expanding the discussion beyond our core community.

Joint Enterprise, Mutual Engagement and a Shared Repertoire

From the outset, the publisher and the editors have established a new and different approach to designing and writing the books. Each text is supported by a team of authors who represent multiple and diverse views of the topic. Each team includes academics, practitioners and thought leaders. Every author has grappled with the topic in a real-world context. Every author sees the topic differently today than they did when the project began. Over the course of several months, through weekly virtual discussions, the scope and coverage were defined. Through mutual engagement and open sharing, each team developed a joint enterprise and commitment to the topic that is enduring. Every author learned through the discussion and writing process. Each project has resulted in a new shared repertoire. We practiced knowledge management to write about knowledge management. We "ate our own dog food."

Acknowledgments of Early Support

The series is a massive effort. If there is value in the series much of the credit must go to two individuals – Dr Elias Carayannis, George Washington University and Dr Manlio Del Giudice, University of Rome. It was Dr Carayannis who first encouraged us to develop a proposal for Emerald Publishers. Of course, this encouragement was just the most recent form of support from Dr Carayannis. He has been a mentor and coach for close to 20 years. It was Dr Carayannis who first taught me the importance of aligning knowledge management with business administration and organizational management. Dr Del Giudice has been generous with his guidance – particularly in setting a high standard for any and all knowledge management research and practice. We are grateful to him for his careful review and critique of our initial proposal. His patience and thoughtful coaching of colleagues is rare in any field. The field will reach its full potential as long as we have teachers and editors like Dr Del Giudice.

Preface

Overview of the Subject Matter

The focus of this book is knowledge translation. Knowledge translation is a core concept in knowledge sciences. It is the essence of articulating tacit knowledge, exchanging it with others and absorbing it. Knowledge translation is what humans do daily when they communicate or interact with others – it is a natural process. When communications are effective, knowledge translation has been successful, at least to a degree. The daily challenge is that we think communications have succeeded, but we never know. They may be successful on the surface – there is no apparent confusion, there is no obvious disagreement – but we do not know whether both the source and the targets in communication have fully understood one another.

This book makes the case for a broad understanding and practice of knowledge translation in everyday work. In the 21st century knowledge economy, knowledge is the primary factor of production. In the industrial economy, financial and physical capital were the critical production factors. Today, the core transaction in a knowledge economy is the exchange – or communication – of knowledge. Where communication fails or is suboptimal – so is the economic transaction. Just as we strive for optimization and equilibrium in an industrial economy market, so is the optimal exchange of knowledge in a knowledge economy.

For this reason, the authors argue that knowledge translation is a core concept that should be widely understood and practiced by everyone. Academics need to have a deep understanding of the concept and its behavior. But, it is more critical that everyday people understand and practice it in the knowledge economy.

The authors conducted extensive literature reviews and had in-depth discussions over a year to determine the state-of-the-art research and identify gaps. What became immediately apparent was the broader need to apply knowledge translation research to every field. A second review of the peer-reviewed and gray literature found little, if any, formally labeled knowledge translation research beyond health and medicine. However, the authors found related research that addressed communications, linguistic, social and other challenges. We noted that core semantic challenges exist with the definition and coverage of knowledge translation research across subject domains.

The authors highlight the need for a holistic understanding of the concept. Knowledge translation has a history of peer-reviewed research in the medical

research to practice field, evidence-based research and information dissemination. Much of the published literature is found in the medical sciences because of the importance of moving new research into practice and feeding practical results back to researchers. While this research is essential, it has two limitations: it focuses on (1) a macro-level translation process; and (2) the translation process without deep consideration of the communicated knowledge. This book aims to raise awareness of knowledge translation, develop a model and framework that can be applied to any subject area, and offer guidance on competencies and capabilities critical to effective knowledge translation.

Where the Topic Fits in the World Today

Like the other books in the series, this text draws from and integrates research and practice from several disciplines. The primary goal of the series is to create stronger ties between the business management and knowledge management disciplines. The topic of knowledge translation will be critical to any organization operating in a dynamic and complex knowledge economy. Every organization must build and maintain a capacity for knowledge translation – and the organization, division, department, team and individual levels. It is challenging because many competencies central to knowledge translation are treated simply as "soft skills" today. Every organization must realize the need to develop a knowledge translation capacity intentionally and deliberately.

The topic of knowledge translation is mature in a select few subject fields and at the macro level (i.e., across communities – research groups to clinical practitioners to public health teams to patients). But this level of focus does not allow us to see the actual translation activities at each step in the more extensive process. Instead, we only know whether the translation was successful, who it was successful for, and what the impact was. As a result, we have few opportunities to develop a deeper understanding of the "what," "how," and "why" of interactions and communications.

Knowledge is a highly complex concept. It is challenging to dive deeper into the "what," "how," and "why" without having a conceptual model and a framework for diagnosing the situation and assessing the results. The book presents a conceptual model of factors across several subject domains and converts the model to a working framework.

Where the Book Fits in the Literature Today

This is the 13th book in the Working Methods in Knowledge Management series. The text addresses the theoretical grounding of knowledge translation and its everyday practice. The authors draw inspiration and grounding from epistemology, psychology, philosophy, linguistics, economics, communications science and cultural studies. They also synthesized relevant research factors and findings into what we hope is a comprehensive and holistic conceptual model. As such, we hope the books provide a cross-disciplinary focus for discussion.

The knowledge management literature has a significant gap in knowledge translation. Rather than the deep treatment it deserves, given its centrality to the

21st century knowledge economy, it is often referred to as similar or equivalent to other similar-sounding concepts, such as knowledge exchange, knowledge sharing and knowledge transfer. While it is relevant, it is distinct from those concepts.

Many esteemed peer-reviewed journal articles, research reports and case studies on knowledge translation exist. To date, though, the authors have not found a book that treats the subject at the depth and breadth it deserves. We hope this book is a first step toward filling that gap.

The Intended Audience for the Book

This text is written for executives and business managers interested in raising awareness of and growing their organization's capacity for effective knowledge translation. It is also written for executives and managers who understand the importance of building those organizations' knowledge capabilities and developing their workforce's knowledge translation competencies. First, it means diagnosing current knowledge translation capabilities and competencies. Knowledge translation growth is grounded in everyday awareness and self-assessment. It means developing a desire to improve our individual, team, department and organizational knowledge translation capacities. Finally, the book is intended to guide managers who realize the critical role that knowledge translation plays in a dynamic and chaotic economic environment.

The book is also written for knowledge management practitioners and other professionals charged with improving knowledge communication, sharing, exchange and transfer within an organization and with an organization's business partners and stakeholders. The book is designed to bridge the gap in perspectives between knowledge managers and business managers, who must work together to adapt the knowledge translation practice to business practice.

The book is also written for academics searching for a conceptual model to integrate the fragmented research on this topic, and to those teaching academics searching for a textbook that bridges that theory and practice. A cursory review of the knowledge management curricula suggests a need for courses and guidance on designing those courses. Finally, it is also written for academics searching for research topics with significant real-world practical value.

Finally, the book is written for teachers, trainers and students searching for well-developed business cases for teaching, learning and illustrative purposes.

Structure of the Book

The book is organized into four sections and 16 chapters. Section 1 speaks to knowledge translation's critical role in the knowledge economy, the essential definition and characterization of knowledge translation, and presents a holistic and synthesized conceptual model. Section 2 explores knowledge translation capabilities and competencies. Section 3 describes a new approach to developing knowledge translation strategies suited to the knowledge economy. Section 4 also describes the new approach to assessing knowledge translation capacity. The challenges and opportunities presented by communication channels in the

21st century are also addressed in Section 3. Finally, Section 4 includes nine real-world knowledge translation case studies from several subject fields.

Each chapter is written like a project description. While the authors can explain how to establish the foundation for and how to conduct assessments, we cannot tell you what to do and what the result should be. Only each organization can make these choices and decisions. Each chapter provides background information on the topic and references to additional resources – both theory and practice. In addition, each chapter highlights the thought leaders and practitioners in that topic. Finally, the Appendix provides a high-level project plan that the reader can use to design their approach. Each Task and Subtask in the project plan traces back to a chapter in the book.

Chapter Summaries

Chapter 1 introduces the concept of knowledge capital and distinguishes it from financial and physical capital. In the industrial economy, financial and physical capital were the significant factors of production. In the knowledge economy, knowledge capital is the primary factor of production. To fuel a knowledge economy, knowledge must flow and flow effectively. Knowledge capital is inherently human. Its structures, properties and behaviors are different from financial or physical capital. The fundamental transactions in the knowledge economy are the human exchange of knowledge. Whether these transactions are successful or not depends on how knowledge is translated.

Chapter 2 focuses on knowledge translation, its history and its evolution. While it is fundamental to all forms of human communication, it has received the greatest scholarly attention from medical research and health sciences. This chapter traces the evolution of the study of knowledge translation from the 1950s to the present time. The authors note several limitations of current models, most notably lacking focus on knowledge as an asset. Finally, the chapter examines the relationship between knowledge translation and knowledge management, communication sciences, and linguistics.

Chapter 3 presents a conceptual model with four components, the elements that comprise each component, and critical questions for each element. The model highlights components and factors determining whether the translation activity will succeed or fail. The model calls out (1) the knowledge being shared; (2) the translation process; (3) the knowledge ecosystem; and (4) the scale and scope of the communication. The model fills a gap in the current literature. From the model, the authors derive a framework. The framework is grounded in the conceptual model, aligns vital questions, and calls out competencies and capabilities.

Chapter 4 distinguishes between competences and competencies. Knowledge translation is a communication – grounded in language – between two or more individuals. The more knowledge translation competence those individuals have developed, the more successful the exchange will be. This chapter identifies and explains the 12 competencies of the language model. The interdisciplinary knowledge translation model is presented, and its three competencies are discussed.

Chapter 5 distinguishes between competences and competencies. Knowledge translation is a communication – grounded in language – between two or more individuals. The more knowledge translation competence those individuals have developed, the more successful the exchange will be. This chapter identifies and explains the 12 competencies of the language model. The interdisciplinary knowledge translation model is presented, and its three competencies are discussed.

Chapter 6 considers current and future approaches to strategy design and development. First, the current approach to strategy and strategic planning is discussed. Then, a new approach to strategy design and strategic thinking is presented. Finally, the implications of strategic thinking for knowledge translation are discussed. Strategic thinking also means anticipating positive, negative and neutral futures. In this chapter, knowledge translation strategies are derived from the language translation model, the expert knowledge translation model and the interdisciplinary knowledge translation model.

Chapter 7 defines channels and explains the effects they have on knowledge translation. The authors define channels and provide common examples. Each technology either enables or constrains communication and interaction. The chapter reviews how different channels support multiple forms of expression and engagement. The chapter also considers the constraints channels impose. Channels may be affected by each of the four components of the framework – the scale the channel can support, the scope it can cover, the forms of knowledge it can handle and the extent of interactions and communications are vital factors.

Chapter 8 notes that just as knowledge translation requires new strategic thinking, so does it require a new approach to monitoring and assessment. Knowledge translation is continuous, immediate and progressive. This chapter considers how assessment changes from the industrial economy to the knowledge economy. The chapter explains how to leverage initial state diagnostics, middle-state learning and end-state review for improving knowledge translation. The authors also explain how to assess the four components in the knowledge translation context.

How the Book Impacts the Field

The authors hope the book will contribute to the communications literature by expanding the discourse about knowledge translation in business and everyday communications. We also hope it will create a new discourse around the knowledge translation capacity of both human and non-human (e.g., AI) actors. Finally, we hope the book expands the discourse beyond medical research to all other subject fields. The book anchors the discussion of knowledge translation in the context of knowledge economies, knowledge work and knowledge capital. We also hope the book provides a practical and real-world discussion of what we mean by tacit knowledge and the processes involved in making it explicit and visible. Ideally, the book adds rigor to the discussion of knowledge translation and creates an extended body of knowledge grounded in practice.

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Knowledge Translation – Concepts, Contexts and Value

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Chapter 1

Knowledge Economy, Knowledge Management and Knowledge Capital

Chapter Summary

This chapter introduces the concept of knowledge capital and distinguishes it from financial and physical capital. In the industrial economy, financial and physical capital were the major factors of production. In the knowledge economy, knowledge capital is the primary factor of production. In order to fuel a knowledge economy, knowledge must flow and flow effectively. Knowledge capital is inherently human. Its structures, properties and behaviors are different from financial or physical capital. The fundamental transactions in the knowledge economy are the human exchange of knowledge. Whether these transactions are successful or not depends on how knowledge is translated.

Why We Care About Knowledge Capital

The topic of the knowledge economy and knowledge work is at the center of our public discourse today. At the center of this new economy is a new form of capital – knowledge capital. In a knowledge economy, knowledge capital is the primary factor of production and a major source of wealth and competitive advantage. Unlike an industrial economy where capital assets depreciate and lose value over time, knowledge capital grows in value the more it is accessible and used. Rather than deriving wealth from conserving knowledge capital, value derives from its circulation and use. Knowledge translation is central to knowledge flows, circulation and use.

Knowledge Economy and Knowledge Assets

The knowledge economy developed exponentially in the last decades and it almost exploded in the last years as a consequence of the unbelievable pressure created by the COVID pandemic upon the social activities and works in the organizations (Baldwin & Weder di Mauro, 2020; Garcia-Perez et al., 2020; Lafayette et al.,

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2019; Viedma & Cabrita, 2012). This accelerated development can be explained by the potential of the knowledge economy to create value for society and having infrastructure as a series of disruptive information technologies and artificial intelligence (AI) applications. The knowledge economy is so named because the core commodity and the primary factor of production is knowledge. Knowledge fuels the knowledge economy. While it has always been a factor in every economic system. And, the shift from an industrial to a knowledge economy has been underway for 70 years. Recent events such as the COVID pandemic have made the transition more visible and accessible. Over the past 70 years, knowledge has been transformed from a philosophical concept into an economic asset with challenging properties for the classical economic theory.

An asset is a resource owned or controlled by a person or a company that has an economic value and the potential of providing a future benefit. Assets owned by a company are reported in its balance sheets. There are two large categories of assets: (a) tangible assets and (b) intangible assets. *Tangible assets* are physical objects which can be seen, touched and measured by using the known measurement systems. Tangible assets are the company's buildings, technological installations and equipment, office furniture, money, computers, raw materials for production, final products, and other physical objects needed to support the production process. *Intangible assets* don't have a substantial or corporal existence. Thus, they cannot be seen, cannot be touched and, as a consequence, cannot be measured by using the known measurement systems. Intangible assets are data, information, knowledge, brands, company's image, patents and organizational values. Integrated at the company's level, these intangible assets yield the company's intellectual capital or knowledge capital. Because knowledge is the dominant and most important component of these intangible assets, most of the authors use the term *knowledge assets* as a generic construct for all those intangible assets mentioned above (Freeze & Kulkarni, 2007; Handa et al., 2019; Teece, 1998). The most frequently discussed economic properties of the knowledge assets (Lafayette et al., 2019) are the following: abundance, experience goods, public goods, non-competitive markets, opportunity costs, cost of time, perishability, embeddedness and infinite useful life.

Unlike tangible assets which increase their economic value with the degree of scarcity, knowledge assets don't experience scarcity. They experience *abundance* because knowledge assets don't vanish when they are used in a production process or disseminated within a social context. Moreover, knowledge assets may increase their value through repeated usage. They are a non-depleting resource. Knowledge assets cannot be valued until they are used in a practical situation. Their value is revealed by their usefulness while we experience with them in solving a problem. They are *experience goods* that can be very useful in a particular context and irrelevant in another one. It is up to us to choose the best knowledge for a specific problem or a given social context. Knowledge that is not experienced by others cannot be valued or validated. Knowledge is *a public good*. This property is essential in understanding the economic advantages of intangible resources over the tangible ones. A public good is one that is non-rivalrous and non-excludable. When a good is non-rivalrous, it can be consumed simultaneously

by many people. For instance, knowledge can be disseminated by a professor to an audience of hundreds of students, or thousands of people can listen to the same melody played on the radio. There is no rivalry between those consumers and no competitions in getting access to the same knowledge. Non-excludable property means that one individual can consume knowledge without paying for it. That is a public good. No individual or organizational entity can claim exclusive ownership of that knowledge which is a public good.

The knowledge economy created a new market able to deal with knowledge and with knowledge embedded in goods and services. Knowledge is not only a resource but also a product and people are knowledge seekers because they need information and knowledge to reduce uncertainty and to find solutions for their problems. Thus, they are knowledge buyers and consumers. Davenport and Prusak (2000) remind us that knowledge markets have buyers and sellers who negotiate to reach a mutually satisfactory price for knowledge goods. Knowledge markets have brokers who bring buyers and sellers together. Knowledge markets have producers and consumers, and even entrepreneurs. Knowledge markets are totally different from the physical objects markets. First, we cannot see and cannot touch knowledge. Second, we just said that knowledge is not a scarce resource leading to competition. Knowledge markets are *non-competitive markets*. However, there is a competition but only for the quality of knowledge and not for its quantity. Economic theories developed for competitive markets and for tangible objects cannot be applied to the knowledge markets. New theories should be developed for the knowledge markets in concordance with these specific properties of intangible assets. Knowledge has *opportunity costs*. An opportunity cost is the cost of making a decision or consumption choice over an alternative one. For the knowledge assets, the opportunity costs go beyond the financial costs because knowledge contains in its complexity rational, emotional and spiritual components. Emotional and spiritual knowledge involves different costs and different time periods for paying them. Moreover, emotional knowledge that reflects our emotional states can impose sometimes high levels of costs with dramatic individual and organizational consequences. For instance, a decision of firing 1,000 employees due to an economic crisis can lead to major emotional costs not only for those fired but also for those who remain in fear and uncertainty with respect to their future. Also, there is a high risk of losing knowledge associated with the experience and expertise of those fired employees. Organizational values and leadership spirituality impose high levels of financial and non-financial costs because of their long-term effects. Thus, decision making should not be exclusively rational and focused on financial issues. It should include emotional and spiritual knowledge as well as their dynamics. For knowledge, there is also a *cost of time*. Integrating knowledge assets into knowledge capital implies a cost of time. These are complex phenomena that cannot be accomplished like processing some physical raw materials. Welding two ideas always is more difficult and needs more time than welding two metal pieces.

Knowledge is *perishable*. Once it is acquired by an individual, knowledge should be shared, transferred and used within the given social context because otherwise it can be lost. Our memory is limited and we cannot store there all the

knowledge we receive or learn. We always store the knowledge we need and use. It is true that once it is lost, knowledge can be re-created but that process may take time and implies some costs. When we use knowledge to produce goods or services we embed a part of it in those entities. Knowledge is *embedded*. It is integrated into other knowledge structures or products like software, AI applications and services of all kinds. In the knowledge economy, the value of a product resides not in its materials but in its embedded knowledge. For instance, a smartphone is more valuable if its software is capable of performing more operations. Unlike physical objects which have a limited life cycle, knowledge assets may have *an infinite useful life*. From economic point of view, this property is extremely attractive because knowledge can be used many times and in a long-time perspective without diminishing its value. The value of the knowledge assets is given by the context in which they are used and by the property of being re-used as many times as necessary. From this point of view, the transactions costs of knowledge assets have a different meaning and computation than those used for tangible assets which have a limited useful life. These economic properties of the knowledge assets will influence our perception of their value and the concrete way of using them optimally.

Knowledge Management and Knowledge Resources

We discussed about knowledge economy choosing implicitly a macro-level reference system, where phenomena result from integrating upward knowledge processes developed within teams, organizations and communities which represent a meso-level of analysis. At this level, economists recognize a continuous transformation process of generic organizations into *knowledge-based organizations* or *knowledge-intensive organizations* (Davenport & Prusak, 2000; Grant, 1996, 1997; Nickerson & Zenger 2004; Spender, 2014; Sveiby, 2001). The knowledge-based theory of the firm is a spin-off of the resource-based view of the firm that considers knowledge as the most important productive resource within a strategic perspective (Barney & Clark, 2007). Because knowledge is a result of the learning process, under its multiple forms, some researchers advanced the idea of the *learning organizations* (Argote, 2013; Senge, 1999). These are organizations where individual learning processes are integrated upward into organizational learning processes which lead to learning organizations.

The integration processes are performed by the *organizational integrators* (Bratianu, 2013). The most important organizational integrators are: technology and processes, managers, organizational culture and leaders. Technology and processes have the effect of aggregating people based on some production routines. The well-known assembly line is conceived as an aggregator of workers who contribute with components to get the final product. Even if today these assembly lines contain many robots instead of people, they still represent the simplest form of organizational integrators. They are linear integrators characterized by processing rational knowledge. Managers represent a superior form of integration acting upon rational knowledge and emotional knowledge because they should motivate people for work, and motivation consists mainly of emotional states

of workers. Organizational culture integrates traditions, beliefs, values, ideals and creates a strong driving force for performance. Leadership constitutes the most complex form of nonlinear integration acting upon rational, emotional and spiritual knowledge. All of these integrators should act in a different way upon knowledge workers than upon industrial workers, as shown by Drucker (2008).

Knowledge management emerged as a needed integrator of knowledge resources, knowledge workers and knowledge processes. Because in any organization there are tangible and intangible resources, and each type of them requests a specific management, knowledge management develops within the general management of the organization, focusing on the intangible resources (Dalkir, 2017; Jashapara, 2011; Liu, 2020; Massingham, 2020). Knowledge management is the management process designed to deal with the creation, acquisition, storage, retrieval, sharing, transferring, transforming, translating, embedding and using knowledge. Synthetically, we may say that knowledge management deals with all processes of knowledge dynamics within an organizational context, including knowledge competencies and organizational capabilities (Garcia-Perez et al., 2020). Some authors focus on knowledge flows and their dynamics within a business or an organization (Nissen, 2006; Zieba, 2021). For instance, according to Nissen (2006), knowledge flow describes how knowledge moves through a group or organization. Although the metaphor of *knowledge flow* is simple and intuitive, it cannot describe the complexity of knowledge dynamics. To understand that complexity we have to discuss the difference between the philosophical and the managerial lenses of approaching the concept of knowledge.

For philosophers, the concept of knowledge is related to the quest for truth (Russell, 1972, 1992). Epistemology is the branch of philosophy that is dedicated to the study of the nature, origin and scope of knowledge, as well as to make the distinction between justified belief and opinion (Audi, 2011). From the ancient times, there were two distinct approaches to explain knowledge: rationalism and empiricism. *Rationalism* has its roots in the philosophy of Plato who considered that there is a physical world represented by objects and a world of ideas or forms. For him, the dominant role is playing by the world of ideas because it is immutable, timeless and changeless, and it provides a kind of reference system against which all instances are measured. Russel explains that knowledge results from our reflection rather than our perception. In the 20th century, Russell (1972) explained that we cannot know things only through the senses alone because the sense alone cannot prove that things exist. Knowledge exists in reflection rather than impression. Perception is not knowledge. Descartes (1997) developed further this distinction between the two worlds of Plato and came with his famous dualism between mind and body. Searching for certainty, he asserted that thought is the only attribute that belongs to him that cannot be detached from him. Man is in essence a thing that thinks (Descartes, 1997). Following this path of reasoning *knowledge* is considered *a justified true belief* (Audi, 2011). Thus, a belief can become knowledge if and only if it is true and justified. Interpreting and applying these conditions makes the distinction between philosophers and managers. For philosophers, there are logical approaches to these conditions and explanations which are beyond the purpose of this book. For managers, the problem can be simplified

by considering that we are interested in knowledge as an organizational resource. That means to consider the organizational context as the necessary background for validating the fact that our belief is true and justified (Nonaka & Takeuchi, 1995). They characterize knowledge as *a dynamic human* process of justifying personal belief that moves toward the truth (Nonaka & Takeuchi, 1995).

The *empiricism*'s approach to knowledge has its roots in the philosophy of Aristotle, a student of Plato. Aristotle considers that there are three kinds of knowledge: *episteme*, *techne* and *phronesis* (Aristotle, 1999). *Episteme* represents the scientific knowledge that is rational and objective. *Techne* represents craft knowledge that is related to production. Thus, craft knowledge is a result of learning by doing which involves our senses and creates our experience. It is an outcome of the experiential learning (Kolb, 2015). *Phronesis* is prudence or practical wisdom, described by Aristotle (1999) as the state where human beings grasp the truth, influenced by both reason and action about our environment. Somehow in line with Aristotle, Polanyi (1983) demonstrates that knowing implies *a tacit dimension*, revealing that perception cannot be ignored in understanding knowledge. Although it is difficult to explain how it happens, we can recognize the face of a person we know based on the information obtained from our sensory system. Therefore, perception becomes an instance of tacit knowing. Polanyi (1983) reminds us that we know more than we can articulate.

Following the new direction opens by Polanyi (1983), Nonaka and Takeuchi (1995) defined the dyad of *explicit knowledge–tacit knowledge* that structures our wealth of knowledge. *Explicit knowledge* is the rational knowledge we can express by using a natural or symbolic language. It is the knowledge we get in schools and universities, supported by a scientific approach. It is the knowledge used by economists and by those managers whose mindsets are shaped by theories. Metaphorically speaking, it is the visible part of an iceberg. *Tacit knowledge* is personal knowledge resulted from direct experience. It is worldless and processed by the unconscious zone of our brain. That explains why we are not aware of how much we know. Tacit knowledge is hard to be formalized and shared with others. Tacit knowledge includes subjective insights, intuitions and hunches. It is deeply rooted in an individual's actions and experiences, their ideals, values and emotions (Nonaka & Takeuchi, 1995).

Knowledge is *a strategic resource* because it is valuable, rare and costly to imitate (Barney & Hesterly, 2012). Knowledge is valuable because without it there is no innovation process, no new products and services. It is valuable for its potential applications and its capacity of creating a sustainable competitive advantage. Knowledge is rare when it is created within an innovation process, and it is costly to imitate when its component of tacit knowledge is dominant. Tacit knowledge is personal knowledge learned through direct experience and it is almost impossible to be replicated. While rational knowledge is more accessible to other people and companies, emotional and spiritual knowledge is unique because it is context embodied. For instance, one of the strategic weapons of Toyota is its organizational culture. An organization's culture is unique. It is impossible to replicate because it is comprised of the individuals who make up the organization and their common values, beliefs and business methods. Culture is both tacit in its