

THE USE OF TACIT KNOWLEDGE TO CREATE ORGANIZATIONAL VALUE

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ABSTRACT

This article reviews, explains, compares, and synthesizes the foundational theories in knowledge management. Its central theme is that knowledge management and knowledge creation are two crucial aspects of strategic management in modern organizations. The identification of the unique properties of knowledge is a starting point for its successful creation and management in organizations. The article briefly examines the context of knowledge management by looking into the originating disciplines and related theories as well as outlines the life and achievements of the most influential scholar in the field – Michael Polanyi. Next, the article discusses the various characteristics of knowledge important for its further successful application, specifically ‘tacit knowledge.’ It then looks into the main theories that involve application of tacit knowledge to modern business organizations. Although several disciplines and theories include some aspects of knowledge management, due to the limited scope of this article, only the two that specifically develop the ‘tacit knowledge’ concept are studied here. Additionally, while some theories discussed in this article are applicable to various levels of analysis, such as individual, group, organization, and inter-organizational, this review is limited to knowledge management and creation within a business organization. The methodology for this research article consisted of secondary research on the influential works on knowledge management. It involved primary sources, when discussing the properties of knowledge and the foundational theories, and secondary sources that provided researchers’ opinion on the importance of the subject. The research on the knowledge management in organizations demonstrated the uniqueness of the qualities of knowledge that puzzled scholars since the Ancient Greeks, the importance of the personal component in any successful knowledge related process, the magnitude of the topic that undoubtedly warrants further research.

Key words: Knowledge Management, Tacit Knowledge, Organisation Knowledge.

INTRODUCTION

Knowledge management is an emerging topic that has gained considerable attention by scholars and business community alike. It deals with processes and practices of identification, accumulation, creation, application, and distribution of knowledge in organizations. Knowledge is arguably the most important strategic resource as, unlike tangible technologies and other process components, it is contextual and the hardest for the competition to duplicate. The purpose of the article is to review, explain, compare, and synthesize information on

foundational theories in knowledge management as they apply to modern organizations.

The article begins with discussion of originating disciplines and related theories, which are the context of modern knowledge management. It also provides a brief overview of life and works of Michael Polanyi, the social scientist and philosopher who developed the idea of ‘tacit knowledge,’ the underlining principle in knowledge management. Next, the article discusses the distinctive properties of knowledge, as proposed by the founding scholar Michael Polanyi in his groundbreaking work ‘Personal Knowledge:

Towards a Post-critical Philosophy' (1962). The article examines in detail the unique characteristics of 'tacit knowledge' due to its contribution to philosophy of science and subsequently to strategic management scholarship.

The article continues with the overview of two main theories that use tacit knowledge concept to manage knowledge in modern business organizations. First, it provides an overview of "Knowledge-based theory of the firm" (KBT) whose advocates rightly suggest that knowledge bases and firms' capabilities are the main contributors to a company's long-term competitive advantage and financial performance. Findings of the often-cited article on the subject – 'Toward a Knowledge-Based Theory of the Firm,' (1996) by Robert Grant – serve as a basis for discussion on the theory. Second, it summarizes later development of the field, primarily by Ikujiro Nonaka, the founder of 'Organizational Knowledge Creation Theory' (OKC), outlined in this principle text on the theory 'A Dynamic Theory of Organizational Knowledge Creation,' (1994). The article concludes with a summary and an opinion on the importance of effective knowledge management in modern organizations and the recent views on the subject.

LITERATURE REVIEW

Knowledge management and KBT principally originated from Strategic Management, which encompasses the analysis, decisions, and actions that a company undertakes to create and sustain competitive advantage (Dess, Lumpkin & Taylor, 2005). It first analyzes the company's strategic direction through aligning the company's vision with delivering value proposition for the clients. Next, it analyzes the internal strengths and weaknesses, and the external environment in which the company operates. The result of the initial strategic management analysis is the strategy formulation. Strategy determines what industries to compete in and how to do it. Second, a company determines a particular course of action that would allow it to maintain long-term competitive advantage. In the last decades, the main source of competitive advantage has been the superior operational effectiveness. However, this type of advantage proved to be very short-term as rivals easily replicate processes due to recent technological advances.

As Michael Porter accurately suggests, operational effectiveness alone will not determine sustainable competitive advantage in the future (Porter, 1979). To sustain competitive advantage, a company has to perform tasks differently or it has to redefine the production process by developing a unique, internally consistent, and difficult to imitate activity system. KBT and OKC offer the solution to increasing pace of technological replication by recognizing the importance of knowledge, as one of the most contextually complex resources that define a company's innovating ability and advocating the role of knowledge creation and management in companies. Knowledge is arguably the most significant strategic resource since it is socially complex and difficult to imitate. The KBT proponents argue that heterogeneous knowledge bases and capabilities determine financial performance and degree of sustained competitive advantage. While KTB traces its origins to Strategic Management discipline, its later adaptation OKC incorporates and builds on several topics of Philosophy (Polanyi, 1962), Cognitive Psychology (Anderson, 1983), and Organizational Theory (Nonaka, 1995) as it analyzes knowledge creation at individual, group, organizational, and inter-organizational levels.

Discipline of Knowledge Management closely relates to several theories and schools of thought that contributed to development of KBT and OKC. KBT builds upon the mid 20th century's groundbreaking "Theory of Growth of the Firm" that is often referred to as a "Resource-Based View of the Firm" (RBV), illustrated in Figure 1, first promoted by Edith Penrose (1959) and later extended by Wernerfelt (1984), Barney(1991), and Conner (1991). The focus of the theory is the analysis and appraisal of importance of managerial activities, decisions, organizational routines, and knowledge creation within the company. The theory argues that the company's resources are critical to its growth ability. An important premise of RBV is that both the management's and the company's success lies in striving towards product excellence and growth maximization (Penrose, 1959). The theory also attempts to explain economic expansion by the processes occurring within the firm. "Managerial Theories of the Firm" further developed the idea and incorporated it into its findings (Marris, 1964). Although Penrose and followers discussed

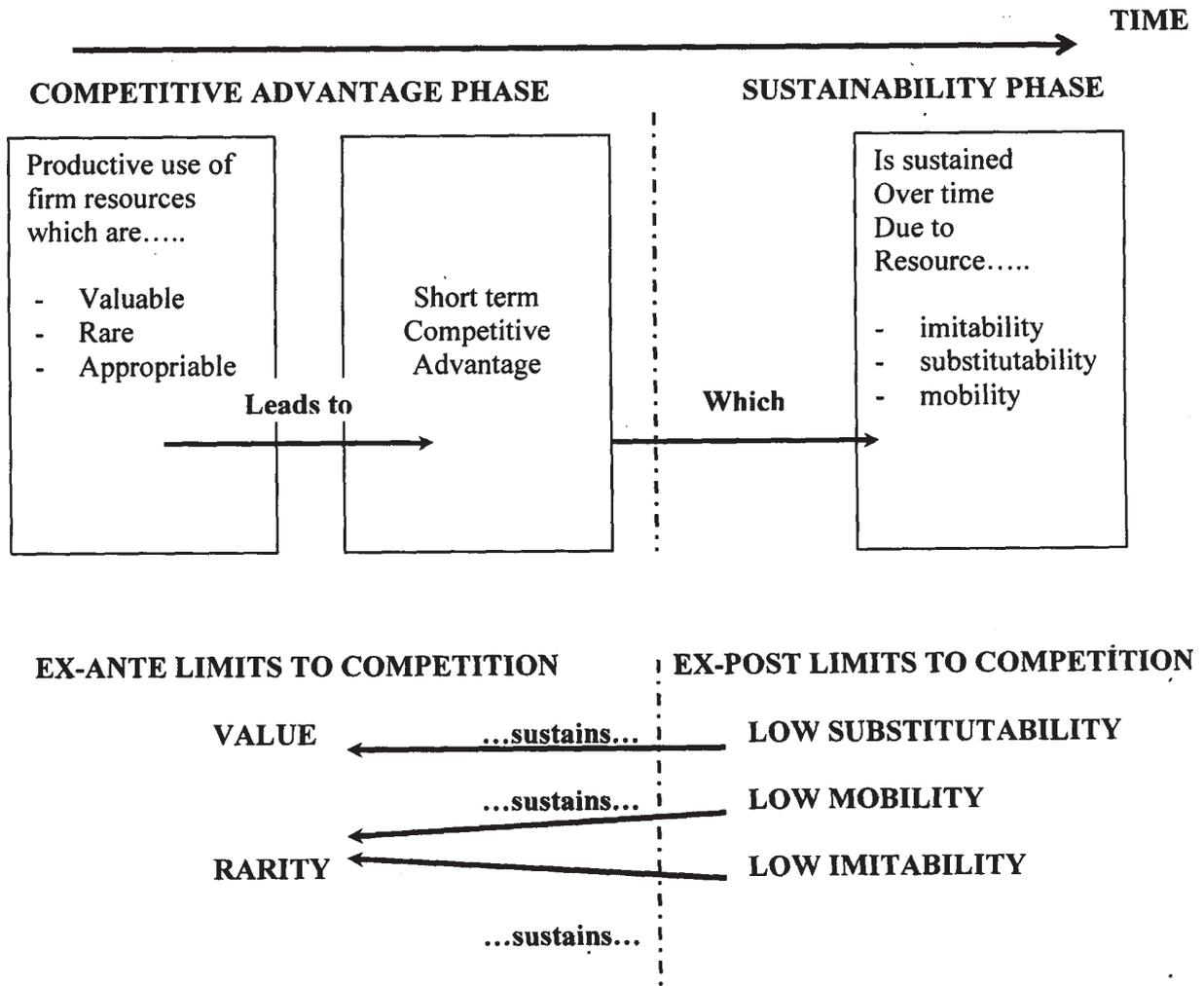


Figure 1 : The Resource Based View Over Time
 Source : Wade & Hulland, 2004, 107 - 142

“knowledge” as one the resources of the company, they treated it as one of the generic resources and did not explore its unique properties. Scholars consider the later formulated KBT an extension of the RBV.

KBT also relates to “Resource Dependency Theory” (RDT), which had been defined by its founding father as “organizations maximizing their power” (Pfeffer & Salancik, 1978). The theory steps away from analyzing intra-organizational relations and starts looking into the links among organizations. It argues, that if company is lacking some important resources it would attempt to establish synergies with the companies that are able to provide them with the lacking recourses demonstrating an exchange based set of power relations. Meanwhile, the company would attempt to balance its dependency on other organizations

by either developing its own resources or by increasing the dependence of other organizations. Although originally formulated to discuss inter organizational dynamics, theorists found that it is applicable to relationship between the different business units within the organization (Pfeffer & Salancik, 1978).

APPLICATION OF TACIT KNOWLEDGE IN MODERN BUSINESS ORGANIZATIONS

Unique Characteristics of Knowledge

Michael Polanyi analyzes various aspects of knowledge in his groundbreaking book ‘Personal Knowledge’ (1952). One of the central ideas developed in this work is the modification of the concept of knowing to allow the introduction of

'personal knowledge' that would avoid the perceived contradiction between the 'objective' and 'subjective.' The academic convention of the time believed scientific knowledge to be objective and independent of any personal characteristic. Polanyi, however, basing his modification on the ideas of Gestalt Psychology, founded by Max Wertheimer, defines knowledge as 'an active comprehension of things known' that requires skill. Next, he proposes that the personal participation of the 'knower' does not make the process 'subjective', as it does not necessarily lead to comprehension. He treats personal knowledge as an active experience, "a responsible act claiming universal validity" (Polanyi, 1962, p. vii). He argues that it remains objective as it assists in getting in contact with 'condition for anticipating an indeterminate range of yet unknown (and perhaps yet inconceivable) true implications'. He finally defines personal knowledge as a "fusion of the personal and objective" (Polanyi, 1962, p. viii).

Fundament Aspects of Human Knowing The analysis begins with discussion of the fundamental aspects of human knowledge mechanism, which he calls 'The Art of Knowing'. They include, in Polanyi's view, the notions of objectivity, probability, order, and powers (skills). "Objectivity" is examined through the lenses of Copernican revolution, positivism, and Einstein's theories of relativity as it demonstrates itself in modern physics. He identifies 'intellectual powers, and their passionate participation in the act of knowing' as main components of personal knowledge (Polanyi, 1962). "Probability" is discussed by assessing the grades of confident *assertion* derived from unambiguous statements, probability statements and maxims. The importance of asserting probability is the ability to judge when the events occurred accidentally and when as the result of a natural law. "Order" is examined as 'randomness and significant pattern' and the relevance of crystallography to experience. Finally, "skills" of personal knowing is discussed as the areas where personal awareness greatly contribute to successful comprehension, the practice of skills (that is, riding a bicycle), destructive analysis (superstition and specious practices), tradition (apprenticeship), and connoisseurship (wine-tasting) (Polanyi, 1962). He concludes the discussion on knowledge mechanism with the proposition that personal knowledge requires an

'intellectual commitment' or 'responsible decision' to apply to 'personal knowing skills'.

Introduction of Tacit Component He proceeds to develop his main thesis of the importance of tacit component in personal knowledge by looking into the origins of intelligence. He first examines different aspects of articulation showing the relationship between inarticulate (animal) and articulate (human) intelligence. He discusses this relationship by applying operational principles of language and powers of articulate thought as well proposed innovative views on logical operations and problem solving. He attempts to apply the mechanics of scientific strive towards the discovery to explaining how the reasoning powers result in articulation (Polanyi, 1962). He states that we share the most fundamental tacit intellectual powers with 'animals and infants' and that the scope of human knowledge expands immensely by the acquisition of speech (Polanyi, 1962). By examining language and articulation, he shows the origins of personal involvement and participation that lie in the very fact of speaking.

Second, Polanyi investigates the role of 'intellectual passions,' which form the foundation of "appreciation of the intellectual beauties of science" (Polanyi, 1962, p. 133). He analyses the main components of intellectual passion – scientific value, heuristic passion, and elegance. 'Scientific value,' in his view, is the scientist's personal opinion in distinguishing which scientific facts are worthy of scientific interest. He shows that a 'sense of intellectual beauty' ultimately guides the assessment of relative importance of demonstrable facts (Polanyi, 1962). He describes the heuristic function of scientific passion as the merger of the appreciation of scientific value into the capacity for discovering it. The heuristic passion is what makes the artist's appreciation of art transform into his creative powers and what guides creative scientists' drive to discovery (Polanyi, 1962). When discussing 'elegance and beauty', he claims that the theory must exemplify an intellectual beauty to be in contact with reality. He shows the validity of this opinion by describing the progression of acceptance of the Copernican system, which originally suffered from bitter confrontation by contemporaries but later became one of the postulates of modern civilization (Polanyi, 1962).

Building on the discussion of passions, Polanyi proceeds to examine the gradual transformation of the initial passionate preoccupation with a problem by the discovering scientist, to its toned down manifestation, when the discovery is published and becomes available to the academic community, to the routine learning of its results by new generations of students, and finally to the accepting of the once novel theory as a true fact. He pointed out that the initial heuristic act of seeking the discovery was full of personal participation whereas the final stage of theory acceptance becomes very public. The dynamic initial process of discovery eventually transforms into a static state of public theory acceptance.

The scientist's attempt to propose a new theory involves all of the intellectual passions, specifically heuristic, and at the same produces an inevitable tension in the academic community resulting in scientific controversy. Polanyi discussed the implications of scientific controversy, the logical gap that separates the existing and the proposed conflicting systems, the great difficulty of persuading others to accept a new view by formal argument, as long as it is done within their framework, and the unfortunate inevitable personal attacks on the opponents in case of rivalry between scientific visions. From this, he concludes that the historic outcomes of scientific controversies undoubtedly shaped our appreciation of scientific value (Polanyi, 1962).

In further investigation of intellectual passions, Polanyi contrasts them to other powerful motivators of human behaviour such as hunger, sex, and fear. On the surface, they display similar to intellectual passions characteristics as they seek to discover the means of satisfaction for their motives. The fundamental contrasting element is that, unlike with satisfaction of the cravings and emotions similar to the ones animals possess, the strive for scientific pursuit does not expire with the incident of discovery. Similar to behavioural passions, scientific discovery resolves the immediate impulse for seeking the solution; however, it results in knowledge of the 'knower,' which, in turn, sustains the drive for further discovery. Consequently, striving for knowledge is a perpetual process as desire for further discovery builds on the preceding achievements (Polanyi, 1962). Polanyi also studied

the unique characteristics of two distinct fields that involve a set of interesting and complex relationships making them invaluable in comprehending various aspects of tacit knowledge, abstract art (especially music) and mathematics. He maintains that "owing to its sensuous content a work of art can affect us far more comprehensively than a mathematical theorem," stressing the importance of personal component in knowledge (Polanyi, 1962, p. 199).

His discussion of intellectual passions concludes with a description of the components of a valid articulate framework. While natural science builds on facts of experience, or 'verification,' abstract fields of mathematics, religion, and various arts are mainly tested and accepted by 'validation' in which personal participation is more evident. Regardless of the articulate system, that constitute a variety of mental dwelling places, 'verification' and 'validation' acknowledge personal commitment and therefore make the process of knowing objective, as they prove the existence of an external to the speaker reality (Polanyi, 1962). Finally, Polanyi asserted the interdependence of intellectual passions, articulate systems, and society, and established the need for convivial support of articulate systems, which enable intellectual passions, by society.

Justification of personal knowledge The exploration of various properties of knowledge continues with the attempt to establish a viable framework for it. It begins by restating the human capacity of acquiring knowledge by utilizing our cognitive powers. Then, it examines the logic of affirmation by looking into the confident use of language, the role of inference, and the function of criticism. Next, it researches the doctrine of doubt by breaking it down to reasonable and unreasonable doubt, scepticism evident in natural sciences, doubt manifestation as a heuristic principle, and religious doubt (Polanyi, 1962). It also demonstrates the three aspects of stability of implicit beliefs and belief systems. Firstly, the beliefs are stable, as the belief holders can meet the objections on at a time. Secondly, the belief stability is rooted in the automatic expansion of its reach due to the manner in which interpretative systems operate. Thirdly, beliefs remain stable as they deny the validity of any rival theories (Polanyi, 1962). Polanyi expands his discussion by providing

insights on universal doubt, which he views as a contributing factor to fanaticism (Polanyi, 1962). He concludes the discussion by emphasizing the importance of commitment and finding that “commitment offers to those who accept its legitimate ground for the affirmation of personal convictions with universal intent” (Polanyi, 1962, p. 324).

Commitment to Personal knowledge Polanyi wraps up his discussion by incorporating his views on commitment to personal knowledge into metaphysics, the nature of ultimate reality. He first probes the ‘logic of achievement’ by studying the rules of rightness, causes and reasons, logic and psychology, and originality in animals. He then proves that our comprehension deepens as we evolve and it affects our knowledge of an animal’s biological achievements. Next, he investigates morphogenesis, the living organism machinery, the development of learning, human knowledge, and the connotation of acknowledgment of superior knowledge concept. He concludes with the deliberation on the ‘definite theory concerning the nature of things,’ which he calls ‘the rise of man’ (Polanyi, 1962). Lastly, he asks himself the question, “Is evolution an achievement?” (Polanyi, 1962, p. 382). In attempt to answer it, he examines the randomness, as an example of emergence, the logic of emergence, the emergence of machine-like operations and ends the discussion with his reflection on first causes and ultimate ends (Polanyi, 1962). He believes that at some point ‘the observer’s appraisal of biological achievement turns into his submission to the leadership of the superior minds’ and at that point “the theory of evolution finally bursts through the bounds of natural science” (Polanyi, 1962, p. 404). He defines a free society as ‘fellowship fostering truth and respecting the right’ and observes the past is shaped by our ultimate beliefs (Polanyi, 1962). Finally, he states “the appearance of the human mind has been so far the ultimate stage in the awakening of the world” (Polanyi, 1962, p. 405).

Knowledge Based Theory of the Firm

Philosophical examination of knowledge characteristics in mid 20th century has evolved into two main theories of knowledge creation and management in modern business organizations.

The first is a ‘Knowledge-based Theory of the Firm’ (KBT). It originates in Penrose’s ‘Growth Theory of the Firm,’ which we briefly described in context section of this article. While RBV stresses the importance of resources to the superior financial performance, it stops short of examining the unique properties of knowledge as they relate to management in modern organizations.

KBT holds that various components of business organization, such as organizational culture, systems, and employees, carry knowledge within the organization. The increasing market value of knowledge has made it an invaluable resource to business organizations and the primary source of Ricardian rents (Grant, 1996). KBT operates on important assumptions and observations that help to understand the nature of knowledge and its implications to business organization. They include (Grant, 1996):

- * Firms apply knowledge to the production of good and services
- * Knowledge is the most strategically important of a firm’s resources
- * Knowledge is created and held by individuals, not organizations
- * Firms exist because markets are incapable of coordinating the knowledge of individual specialists. This is the role of the management within a firm.

KBT mainly deals with the effective management of common and specialized knowledge within the organization. One of the central ideas of the theory is the importance of coordination of specialized knowledge. The convention of the time, developed by the organizational theory scholars, held that the main obstacle to superior achievements within the organization rests in lack of cooperation due to conflicting goals of members of organization, that is, employees vs. owners (Weick, 1979). Grant states that even if organization achieves cooperation, the coordination of the specialized knowledge remains challenging (Grant, 1996). He proposes the following mechanisms of coordination of specialized knowledge:

- * ‘Rules and directives’ - this mechanism deals with etiquette, social norms, and procedures
- * ‘Sequencing’ – the manner of independent input by each specialist

- * 'Routines' – or 'coordination by mutual adjustment,' mechanism supporting simultaneous performance of specialized tasks by individuals
- * 'Group problem solving and decision making' - unlike the first three mechanisms, this one approaches efficiency through minimizing communication, and providing tasks of high complexity and uncertainty requiring more personal contact and communication.

Another challenge lies in successful coordination of common knowledge in organization. The theory determines the main types of common knowledge as (Grant, 1996):

- * 'Language' - and other forms of symbolic communication - literacy, numeracy, software, and statistics
- * 'Commonality of specialized knowledge' – the level of communication depends on how specialized is the knowledge two people have in common. The purpose of the communication is to share the specialized knowledge since the benefit of integration is limited to different types of knowledge. In addition, if people have entirely separate knowledge bases, then integration can only occur at a very basic level.
- * 'Shared meaning' – the successful transfer of tacit knowledge largely depends on common mental frameworks. Metaphors, analogies, and stories greatly contribute to effective transfer as they allow reconciling different individual experiences.
- * 'Recognition of knowledge domains' – the crucial step in knowledge coordination is the acknowledgement and studying of the knowledge bases of others.

The theory rightly holds that the competitive advantage of an organization primarily depends on its ability to coordinate and integrate knowledge collectively held by individuals within the firms. In the modern environment, the knowledge integration process and the mobility of employees determine the organizational capability in larger degree than the specialist knowledge that employees possess. Thus, the integration of common knowledge, rather than development of specialist knowledge, becomes increasingly important. Since the broader the scope of knowledge the company integrates the harder it is to replicate, coordination becomes

a crucial source of sustained competitive advantage. Innovative organizational practices, such as cross training, job rotation, etc., achieve successful integration and coordination of common knowledge (Grant, 1996).

Organizational Knowledge Creation Theory

The dynamic OKC provides further application of tacit knowledge concept, as it moves from an issue of the existing knowledge management within the organization to its creation. The theory primarily builds on classic works of Michael Polanyi; however, Professor Ikujiro Nonaka, eminent authority in knowledge management, formally defined it in mid 1990's. He outlined the theory in an article, 'A Dynamic Theory of Organizational Knowledge Creation' (1994) and later expanded it in his best-known book, 'The Knowledge-Creating Company' (1995). When developing OKC, he summarized, synthesized, and modified the ideas proposed by other scholars whereby demonstrating the importance of social interaction to knowledge creation advocated in this theory.

Nonaka's approach to knowledge derives from the importance of practicality emphasized in Japanese culture. He believes that knowledge is a livelihood of an organization, and proposes a practical application of tacit knowledge concept, developed by Polanyi, to enhance organizational 'knowledge creation'. The theory restated classic definition of the types of knowledge. According to Nonaka, tacit knowledge involves an 'analogue activity' of communication in attempts to share it to achieving mutual understanding. This type of understanding involves 'parallel processing' of continuous complex variables. On the contrary, explicit knowledge is discontinuous, discrete, and involves 'digital' processing. The focus of the theory is tacit knowledge, which Nonaka uses to gain further access to knowledge resources of the person (Nonaka, 1994).

Personal tacit knowledge, often defined as the flow of information that individuals created by their committed and effective actions, provides starting point for OKC. The theory discusses the need for conversion of internal tacit knowledge into a codified knowledge that company can share among its

members, and proposed a framework for its crystallization and amplification (Nonaka, 1994). Nonaka developed a 'spiral' process of OKC, which demonstrates the various stages knowledge undergoes in organization. First, knowledge converts among various tacit forms, second, it moves from tacit to explicit state, third, it modifies among different explicit possibilities, and finally becomes a tacit knowledge on an organizational level. The stages are very distinct as they involve unique experience for participants and require different personnel management styles (Nonaka, 1994).

These conversions become the 'modes on knowledge creation', illustrated in Table 1; they

constitute the core contention of OCK. 'Socialization,' the first stage, involves the interaction between individual members of 'microcommunity' through mechanisms of observation, apprenticeship, and imitation. 'Externalization,' the next stage, allows for conversion of tacit knowledge to explicit knowledge comprehended by others often through the contradictions found in metaphor and harmonies present in analogy. In 'Combination,' the third stage, the newly explicit knowledge becomes widely communicated, discussed, modified, in other words, combined through conversations or using information systems. The final stage, 'Internalization,' converts the new organizational

Table 1: Modes of Knowledge Creation

	Tacit Knowledge	Explicit Knowledge
Tacit Knowledge	Socialization	Externalization
Explicit Knowledge	Internationalization	Combination

Source: Nonaka, 1994, p. 19.

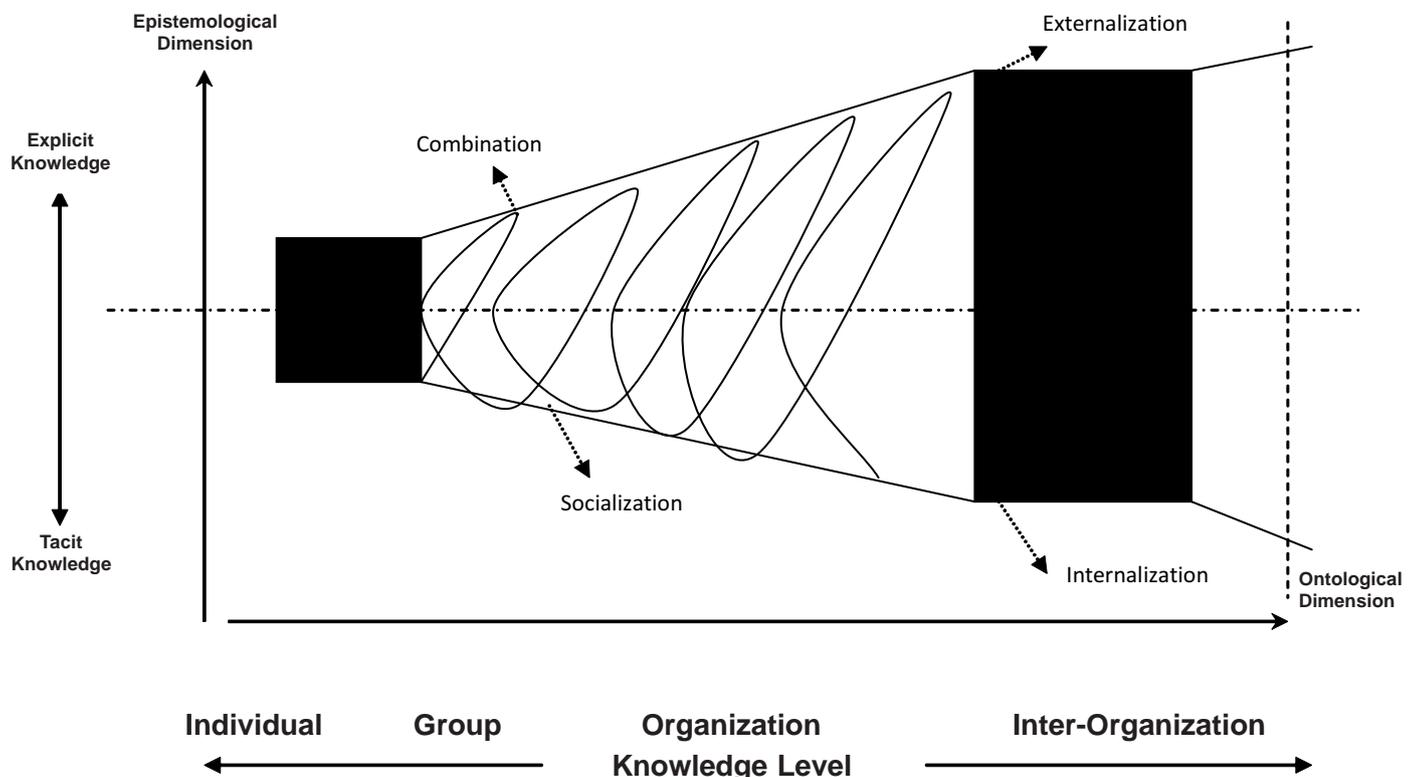
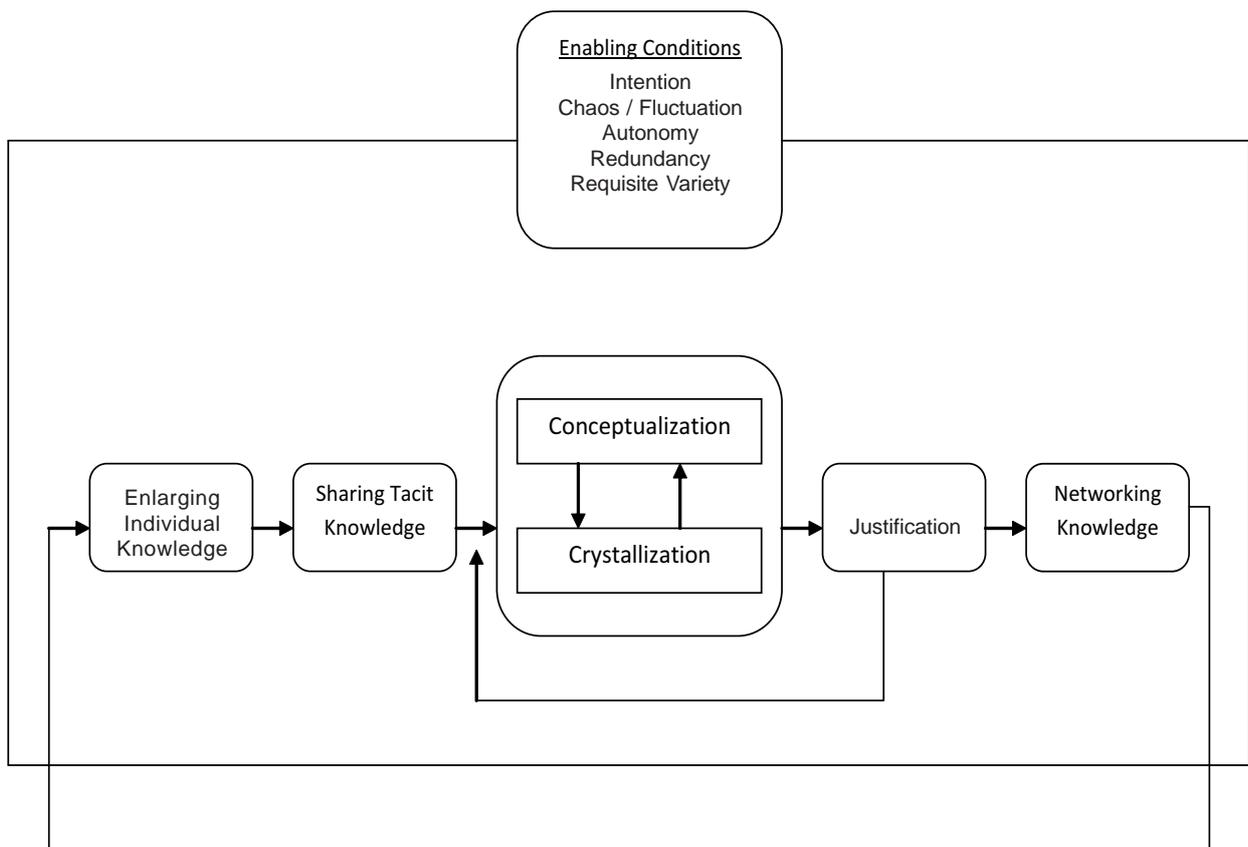


Figure 2: Modes of Knowledge Creation
Source: Nonaka, 1994, p. 19.

explicit knowledge back to its tacit form, however on an organizational level.

While all four modes can create knowledge independently, the creation of organizational knowledge is only possible when they interact dynamically and support the continuous exchange between the tacit and explicit knowledge that takes place in externalization and internalization. This continuous interchange and dynamic interaction between all four modes of knowledge conversion consequently leads to a 'spiral' model of knowledge creation, illustrated in Figure 2. The model demonstrates that with the increasing number of players, the interaction between the tacit and explicit knowledge accelerates. Since the conversion process starts at the individual level and moves towards the group level, and eventually the organizational level, the upward spiral visually represents the organizational knowledge creation process (Nonaka, 1994).

The theory proceeds to suggesting practices that enable application of the 'spiral' model to a corporate organizational setting. Among the suggested initiatives are – 'the enlargement of an individual's knowledge', 'sharing tacit knowledge and conceptualization', 'crystallization', 'the justification and quality of knowledge', and 'networking knowledge' (Nonaka, 1994, p.20). The theory concludes with reflection on practical aspects of OKC and outlines the organizational knowledge creation process, illustrated in Figure 3. It combines the aspects of 'individual commitment' – intention, autonomy, and fluctuation – with the 'organization-wide' enabling conditions – creative chaos, redundancy, and requisite variety and develops two specific management models. While the first, 'middle-up-down management', relates to managerial style, the other, 'hypertext' organization, focuses on organizational design (Nonaka, 1994).



**Figure 3 : Organizational Knowledge Creation Process
Process of Generating Information / Knowledge in the Market
Source : Nonaka, 1994, p.27.**

CONCLUSION

Organizational Knowledge Creation (OKC), a well-known theory that adapted Polanyi's work to modern business environment, advocates an innovative model, which allows the transformation of personal tacit knowledge into the organizational knowledge by applying four very distinct modes of knowledge conversion – 'Socialization,' 'Externalization,' 'Combination,' and 'Internalization.' The 'spiral' model of organizational knowledge creation effectively demonstrates the effects of the dynamic application of all four stages of transformation.

Subsequent research in the field has led to additional insights by various authors who have developed the direction of future research. One of the important aspects of research is that the transferability of knowledge greatly depends on its specific characteristics. While explicit knowledge (codified knowledge) can be easily articulated, communicated, and transferred between the individuals and organizations, transfer of tacit knowledge (skills, and know-how) is challenging and costly as it only becomes apparent when applied (Nonaka, 1994). Kogurt and Zander discussed the added challenges in knowledge application as the typical production process of goods or services requires application of many types of knowledge (1994).

It can be added that, as the complexity of the production processes exponentially increases, knowledge management will become instrumental to ultimate success for most business organizations. The importance of the issue becomes even more apparent with the increased globalization, as many organizations move their operations across the boarder in search of lower cost of production. As the article demonstrated, the transfer of tacit knowledge is difficult, slow, and costly due to the existence of the personal component, the very same component that actually makes it contextual, difficult to replicate, and hence, valuable. Dealing globally adds another dimension to the challenge due to cultural differences, diverse religious beliefs, and possibly conflicting value systems.

The economies of scale and scope play an important role in knowledge management. The economies of scale can achieve the reduction of the average cost since the initial knowledge creation is costly while the subsequent applications are not. Additionally, the economies of scale can translate into the economies of scope since knowledge is a general resource and is not specific to the particular production process. (Grant, 2002). Recent research further developed the economies of scope and scale assertion by determining the extent of its application based on the types of knowledge. The economies of scope and scale prove to be great in the case of explicit knowledge since its creation is expensive, but replication is cheap; meanwhile, the initial cost of tacit knowledge tends to be lower, but the replication is slow and expensive (Shapiro & Varian, 1998).

These modern views provide an interesting perspective and indicate the direction of further research. The importance of knowledge management can not be overestimated by the scholars and business community as the modern organizations are often said to have become 'knowledge organizations'.

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