

THE ROLE OF KNOWLEDGE IN BUILDING QUALITY MANAGEMENT SYSTEMS

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Summary

Quality and knowledge are often quoted as sources of competitive advantage and therefore serve the same goal and are often simultaneously used. If we consider the fact that quality management is based on a series of tools and systematic approaches to problem solving which causes continuous improvement and constant learning, then its connection with knowledge management is obvious. The fundamental objectives of knowledge management and quality are the same: to create more organizational knowledge so that improvement can occur. The paper starts with a brief theoretical background on quality and knowledge management, while the main part analyzes the influence of quality management systems (QMS) on certain knowledge management aspects: knowledge management (KM), knowledge creation (KC), knowledge assurance (KA) and knowledge dissemination (KD).

Key words: *quality management systems, knowledge management, TQM.*

1. INTRODUCTION

Since quality management systems (QMS) constantly search for the most effective ways of satisfying customers, it is obvious that this system needs to be changed over time in accordance with changes in customer demand. Knowledge management is important in this process from two perspectives. The first one is achieving effectiveness (highest quality with lowest costs) that can be done only if knowledge about solving specific problems can be

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codified, transferred and used by all employees in shortest time possible. The second aspect is the constant pursuit for finding and satisfying customer requirements where knowledge again plays a crucial role. In this second aspect the role of transforming information into knowledge is especially important.

2. QUALITY MANAGEMENT

Quality has evolved over time from being related to the production line to becoming one of the basic management systems that needs to be closely aligned with corporate strategy. This evolution has started with quality control moving on to quality assurance and is nowadays incorporated in quality management systems. At the heart of this concept lie the customer and the fulfilment of his requirements. These requirements need to be more than fulfilled because customers should become aware that no other competitor can satisfy them in a better way (Lazibat, 2009). There is a wide variety of quality management systems in use today, such as: TQM, ISO 9001:2000, Six Sigma, Lean management system, Business excellence frameworks.

Although their methodology can differ, all QMS have similar elements and above all the same purpose. TQM is the most famous QMS because it has been in use for more than 50 years and much research on this topic has been done. For this reason this paper primarily analyzes TQM, although conclusions can be applied to all other QMS.

The core philosophy of TQM rests on three distinct principles- total involvement, continuous improvement and customer focus. These three principles are closely correlated to one another. Continuous improvement is undertaken due to pressure driven by customer's needs and satisfaction. This improvement must be processed by all functions in the organization, which translates them into total involvement. TQM encompasses two groups of elements: mechanistic and organic elements. The lack of understanding of these two groups of elements together with their interactions has according researchers been the main cause of many TQM implementation failures (Prajogo & Sohal, 2004). These three basic principles and two groups of elements are all closely related to knowledge management as will be discussed later in the paper. Mechanistic elements (drawing on historical statistical roots) are characterized by an emphasis on cognition while organic (cultural & people based) primarily focus on social constructionist elements. Mechanistic TQM is more likely to focus on problem solving, leading to small continuous improvements, while critical organic TQM is more likely to lead to reframing and breakthrough.

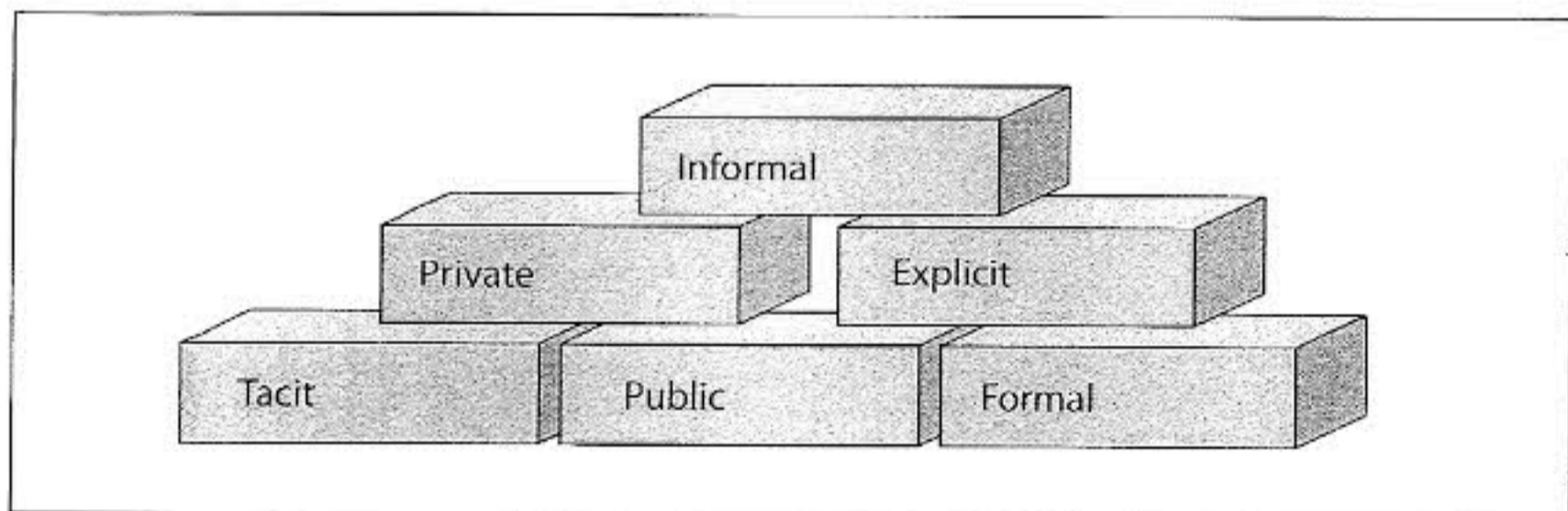
3. MANAGING ORGANIZATIONAL KNOWLEDGE

The importance of knowledge as a source of competitive advantage has grown significantly over the last couple of decades. Especially since the 1990s, management literature changed its emphasis from trying to understand what firms must do to position themselves in the competitive environment to exploring what capabilities are required for survival and change. The main conclusion was that competitive advantage resides not in firms' products but in their competencies. These are defined as knowledge, skills, management processes

and routines acquired over time and difficult to replicate- this may be because they are constantly changing and updating them (Trott, 2008).

The main two kinds of knowledge are tacit and explicit knowledge. Tacit knowledge is resident within the individual or collective parts of the organization and is non-verbalized, intuitive and unarticulated knowledge. Tacit knowledge can be further divided into cognitive and technical elements. The cognitive element refers to an individual's mental models, consisting of beliefs, paradigms and viewpoints so ingrained that we take them for granted. The technical component consists of concrete know-how, crafts and skills that apply to a specific context. Explicit knowledge is specific articulated knowledge; it is codified and can be transferred through formal language or communication systems. The purposes of making knowledge explicit are not only to make it easier to transfer but also to help generate human reflective thinking. The ontological dimension of knowledge begins with individual knowledge and then moves to higher levels including group, organizational, and inter-organizational. Beside the tacit and explicit knowledge there is a wide group of knowledge dimensions shown in picture 1.

Picture 1: Knowledge taxonomy



Source: McAdam (2004), pp. 700

It is important to recognize that the knowledge base of an organization is not simply the sum of individual's knowledge bases. Organizational knowledge represents internal systems, routines, shared understanding and practices. In the past it was loosely described as part of an organization's culture, along with anything else that could not be fully explained. Organizational knowledge, however, represents a distinctive part of the much broader concept of organizational culture. The knowledge base of an organization is defined in this view as "the accumulation" of the knowledge bases of all the individuals within an organization and the social knowledge embedded in relationships between those individuals. These relationships are often recognized as organizational processes and procedures (Trott, 2008).

Adler and Shenhar (1990) suggest that an organization's knowledge base is made up of several dimensions: *Individual assets*- the skills and knowledge of the individuals that form the organization, *Technological assets*- the set of reproducible capabilities in product, process and support areas, *Administration assets*- the resources that enable the business to

develop and deploy individual and technological assets, *External assets*- the relation that the firm establishes with current and potential allies, rivals, suppliers, customers, political actors and local communities, *Projects*- the means by which technological, organizational and external assets are both deployed and transformed.

Knowledge management (KM) is a planned, structured, approach to manage the creation sharing, harvesting and leveraging of knowledge in organizational assets, to enhance an organization's ability, speed and effectiveness in delivering products or services for the benefits of clients, in line with its business strategy (Du Plessis, 2007).

According to Hsu & Shen (2005) the objective of KM is to avoid reinventing the wheel in organizations and reduce redundancy in knowledge-based activities by successfully leveraging the existing knowledge assets. This ushers in the *first generation of KM*. In this generation most KM initiatives have a conservative impact. They reinforce the status quo as they codify the existing way of thinking and working. While the core capabilities today may be the core rigidities tomorrow in this constantly changing environment, organizations should take a more proactive role than building knowledge repositories. In the *second generation of KM* people are trying to take advantage of unexploited business opportunities by synergizing the ideas and processes between different internal units. With an understanding of the effects of one's actions on other parts of a company, people can better coordinate their actions in order to support one another's work and realize synergies. Although KM offers opportunities to support the reworking of processes between units, the greatest benefits promised by KM come as innovation. With high levels of knowledge integration enabling people to deeply understand one another's work, people are able to explore the root causes of problems, question assumptions and then develop novel solutions to problems that markedly improve current practices. The *third generation of KM* focuses on innovation, producing breakthroughs and future growth that the company will depend upon as global markets become more uncertain.

Researchers diverge in regarding knowledge as an object or a process. If knowledge is viewed as an object, the focus should be on building and managing knowledge stock. If knowledge is viewed as a process, the focus should be on knowledge creation, sharing and distribution process (Hsu & Shen, 2005). The literature agrees that those who believe knowledge is the result of sharing largely tacit forms of information and data between individuals, groups and organization could be loosely categorized as those with a humanistic approach. On the other hand those that believe KM is more about the collection, storage, codification and dissemination of information and data in an efficient manner can be loosely defined categorized as those with an information technology (IT) focus.

The pivotal role of creativity in organizations has been widely recognized by the academic community. However, literature in this area reveals two separate strands, namely idea generation and knowledge creation (KC). The concept of knowledge creation (KC) has been described by a composition of descriptors (McAdam, 2004): the ability to originate novel and useful data; chaotic, unstructured and unsystematic; when a firm acquires and adopts knowledge creation from others, it modifies knowledge to make it suitable. Within the KC literature the importance of underlying philosophy of KC is emphasized. Distributed cognition (rationalism & empiricism) and social constructionism (sociology & knowledge)

were found to underlie approaches to KC. It was found that KC based on both kinds of philosophies can co-exist in a mutually enhancing manner in organizational KC efforts, rather than being treated as mutually exclusive. The idea generation literature tended to focus on mechanics of idea generation to the detriment of the underlying KC philosophy. The main focus was on source based approach with the emphasis on external knowledge sources such as customers, markets and competitors (McAdam, 2004).

Knowledge Acquisition (KA) includes the processes that the organization undertakes as a means of determining what the customer's expectations are of the products, and it can be formalized as (Stewart & Waddell, 2008): *"This customer focus requires companies to build up close relationships with their customers and constantly acquire knowledge/information about their product so as to improve their products quality according to customers feedback. This establishment of strong links with customers is useful in the development of designs, allowing determination of which specifications and tolerances are critical from the customer's perspective"*.

Knowledge Dissemination (KD) within the organization is also important. For example: the encouragement of face-to-face interaction between product development team members enables creative improvisation and real time knowledge sharing, leading to effective knowledge dissemination.

4. RELATIONSHIP BETWEEN QMS AND KNOWLEDGE PROCESSES

Every crucial aspect of QMS such as improvement activities, problem solving, team work, process approach etc. can be considered as a basis for a certain form of knowledge management. Most quality improvement activities require the creation of new knowledge for the organization. Deming (1994) said that "best efforts and hard work, not guided by new knowledge, only dig deeper the pit we are already in". This suggests understanding knowledge should play a central role in understanding organizational improvement activities (Linderman et al., 2004).

Academic literature on knowledge and quality has focused primarily on explicit knowledge, which tends to be easily shared and imitated. However, Dooley (2000), noted that "since the ultimate value of a firm depends on knowledge that cannot be imitated, it is reasonable to assume that knowledge which is tacit and not easily imitated, as opposed to explicit knowledge, will grow in importance. For this reason we might expect quality management systems will increasingly focus on tacit knowledge".

Teece (1986) distinguishes between "static routines" which refer to the capability to replicate previously performed tasks, and "dynamic routines" which enable a firm to develop new competencies. Indeed, dynamic organizational routines are very often those activities that are not easily identifiable and may be dominated by tacit knowledge (Trott, 2008). QMS are often associated with emphasizing only "static routines" mainly through process approach but TQM consists of a whole range of so called soft elements whose purpose is creating new knowledge or in this case "dynamic routines".

Knowledge creation (KC) is linked to the theoretical underpinning of TQM through customer focus, continuous improvement, teamwork and adaptation in dynamic markets. Organizations which already have an established critical organic TQM culture can readily adopt their efforts to enhance knowledge creation (KC) within the organization without fundamental change (McAdam, 2004).

The fundamental objectives of knowledge management and quality are the same—create more organizational knowledge so that improvement can occur. As Dooley (2000) suggested, the future of the quality management discipline will require a greater understanding of the role of tacit knowledge. Since quality management is an organizational wide approach to improvement, it is imperative to consider comprehensive theories of knowledge in understanding quality (Linderman et al. 2004).

Table 1: Summary of similarities and differences between KM and TQM

TQM		KM
Similarities	Results orientation People-based management Teamwork Leadership Delight the customer	
Differences	Continuous improvement → Management by fact →	More on innovation More on culture

Source: Hsu & Shen, (2005), pp. 360

Using the tools associated with process control reduces the causal ambiguity of the firm's processes, aiding knowledge transferability. In turn, it affects the visibility of knowledge, facilitating its search. Since the data on different processes carried out by the organization are available, comparing and evaluating the data is easier, and at least it serves as a signalling system. The ISO 9000 certification has, in turn, been considered as a mechanism for encoding the knowledge residing in the organizations' processes due to the emphasis it places on documenting these processes (Molina et al., 2004).

In studies both on TQM and on knowledge transfers, the idea is to create a climate of trust that generates sufficient social controls, either by members interiorizing the objectives, or by ensuring their individual objectives, so that the structures' ultimate goal is not to control opportunism, but to improve the processes that lead to quality and the creation, transfer and integration of knowledge. For this to occur, flexible work teams are called for—also known as knowledge communities in the case of knowledge management. The need for cooperation inherent in TQM is not limited to the relations within the firm. Cooperation with the remaining links in the customer-supplier chain is also necessary.

Molina et al. (2004) confirm the importance of the ISO 9000 for knowledge transferability. In turn, TQM does not have an effect on transferability but does increase transfers (especially internal ones). The results of the study also confirm complementarity of ISO 9000 and TQM since they affect different aspects of knowledge transfers. While ISO 9000

aids transfers by influencing the degree of knowledge transferability, TQM does not affect this aspect, concentrating on the aspects regarding human resource management and organizational culture.

In order to support TQM effect on KM practices (creation, storage, distribution, application), companies should follow nine practical directions (Ju et al. 2006):

1. Top management supports the implementation of the four KM value chain activities in terms of goal setting and resource allocation,
2. All employees should commit to company's policies of KM and value chain activities
3. Quality measurement should be set up to measure the four KM value chain activities
4. Other companies that are known for their good practices of KM value chain activities should be benchmarked
5. The concept of process management should be applied and a suitable process for KM value chain activities should be developed
6. TQM's emphasis on quality, customer involvement should be applied, and other departments should participate in KM value chain activities
7. Training for employees should be provided in order to further understand KM value chain activities
8. The employees should be authorized to organize formal and informal KM communities
9. Customers' opinion and satisfaction should be valued in the design of the four KM value chain activities

5. CONCLUSION

Every element of QMS is closely related to a certain form of knowledge management, for instance knowledge acquisition (KA) with customer focus and knowledge dissemination (KD) with team working. From the point of view needed for this paper the key is in dividing the quality elements on mechanistic and organic elements. These two groups of elements are present in all QMS but the importance of one or the other varies. We can consider the use of ISO 9001:2000 as a QMS that emphasizes mechanistic (hard) elements (process approach) while TQM emphasizes organic (soft) elements (people involvement, leadership). It is also obvious that mechanistic elements are connected to explicit knowledge, while organic elements have more in common with tacit knowledge. As a result of faster changing environment, QMS have recently changed their focus from hard elements to soft elements promoting the need for small step incremental improvements but also considering radical improvements. It can be seen from this request that QMS are incorporating some elements of innovations and in that way becoming even closer to KM. As a result, knowledge management's role in QMS is changing from emphasizing explicit to tacit knowledge as the

only way in which companies can gain certain competitive advantages. In the end it can be said that through accepting all forms of innovation (even radical), QMS are becoming even closer to KM and in the end may represent different sides of the same coin.

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ULOGA ZNANJA U IZGRADNJI SUSTAVA UPRAVLJANJA KVALITETOM

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Sažetak

Kvaliteta i znanje često se navode kao izvori konkurentskih prednosti te stoga služe istom cilju, a isto tako se i istodobno primjenjuju u organizacijama. Kad se razmotri činjenica da se sustavi upravljanja kvalitetom temelje na sustavnom pristupu i nizu alata za rješavanje problema koji uzrokuju kontinuirana poboljšanja i neprekidno učenje veza kvalitete i znanja postaje više nego očita. Temeljni ciljevi sustava upravljanja kvalitetom i znanjem su isti: stvaranje više organizacijskog znanja koje omogućava kontinuirana poboljšavanja. Rad započinje kratkim teoretskim osvrtom na upravljanje kvalitetom i znanjem dok ključni dio analizira utjecaj sustava upravljanja kvalitetom na određene aspekte znanja kao što su: upravljanje znanjem, kreiranje znanja, osiguranje znanja te diseminacija znanja.

Ključne riječi: sustavi upravljanja kvalitetom, upravljanje znanjem, TQM.

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