TOTAL QUALITY MANAGEMENT IN A KNOWLEDGE MANAGEMENT PERSPECTIVE

CARL GUSTAV JOHANNSEN
cgj@db.dk

Department of Library and Information Management, Royal School of Library and Information Science, Birketinget 6, DK 2300 Copenhagen S, Denmark

There are similarities between information management (IM) and knowledge management (KM), but the latter is wider in scope and includes (especially) aspects of process and learning which are not major concerns of information management as generally understood. This article presents theoretical considerations on both similarities and differences between IM and KM, and summarises the points made into a conceptual model of basic KM processes. It is emphasised that KM operates in a quite different way from IM and that management must see ‘knowledge’ in a much wider sense than that of document storage and retrieval per se. The point is made that a knowledge management perspective on business processes, training and achievement of business objectives is relevant in a different way from IM which has up till now been used in an information service way to refer to repository-based systems. This point is illustrated by using total quality management (TQM) as an example. The examination of TQM-based management tools reveals that the application of these tools is interesting from a KM point of view, having significant consequences especially in terms of knowledge creation, accumulation and sharing.

Firms need to shift their attention from documents to discussions [1, p. 106].

1. INTRODUCTION

The main aim of this article is to deal with the following question: to what extent does the application of total quality management problem-solving tools influence knowledge management (KM) processes? By answering this question I hope to gain some fruitful insights as to both substantial and methodological issues.

Today a number of different approaches to KM co-exist [1, pp. 166–172]. The one most used by firms is probably the technology-centred approach focusing on installing intranet webs, Lotus Notes and other knowledge-oriented software. At the other end of the hard-soft spectrum there is a second approach which focuses on organisational learning largely by addressing cultural and behavioural issues. According to Peter Senge, the guru of the organisational learning movement, organisations seeking to manage knowledge have placed too much emphasis on information technology and information management [2]. A third approach...
which is maybe the second most popular [1, p. 167] is to build on a company’s quality or re-engineering efforts.

Given this last context, it is interesting to see how KM concepts fit into a total quality management (TQM) perspective and how they might help us to understand the mechanisms and dynamics of quality programmes. Since TQM is a huge area, I have chosen a narrower scope focusing on the quality control (QC) problem-solving tools.

While KM is not a well-defined concept, I will use some space to define basic KM processes, and also to emphasise that KM in a number of respects is distinctively different from its sister discipline, information management.

2. KNOWLEDGE MANAGEMENT AND INFORMATION MANAGEMENT

In fact, KM is frequently used – inaccurately – as almost synonymous with information management (IM). This usage is partly justified because IM and KM share a common purpose: to facilitate the shaping, distribution and sharing of knowledge to achieve business goals, objectives and strategies. Also, the economic and social forces leading executives to focus on KM and on IM [3] are quite similar. However, the two disciplines also differ in a number of respects. To illustrate these differences let us consider the main elements of KM. Earl [4] proposes that at least four components are required for a business to build a strategic capability in knowledge:

- knowledge systems;
- networks;
- knowledge workers; and
- learning organisations.

IM literature also emphasises at least the first three aspects, whereas learning organisations as well as the concepts related to both individual and organisational learning are outside the scope of most IM literature. A typical definition of IM reads: ‘the effective production, storage, retrieval and dissemination of information in any format and on any medium to support business objectives’ [5, p. 4]. Some information managers and information scientists think of IM primarily in terms of documents (mainly published), while others may extend the scope of IM to cover all textual material including all kinds of documents generated within an organisation. A still wider definition includes transactional records: orders, invoices, accounts, budgets and so on [6, p. 131].

Typical IM issues include how an executive information system may influence decision-making quality, how IT and information can be used to achieve competitive advantage, and how alignment between IT strategy and business strategy may be accomplished. KM, on the other hand, is much more people-oriented, focusing on human resource management issues such as learning processes, continuous education, culture, values and attitudes, etc. Organisational themes such as facilitating switches between different modes of knowledge, e.g. explicit or tacit, individual or collective knowledge [7, p. 77], ensuring double-loop learning, and the like, are here considered to be key issues. Within the KM literature a descriptive approach focusing on learning styles and a normative approach emphasising facilitating factors can be identified [8].
In comparison to IM, management of knowledge goes beyond the storage and manipulation of information. It is an attempt to recognise what is essentially a human asset buried in the minds of individuals, and reveal it as an organisational asset that can be accessed and used by the company.

According to Nonaka knowledge management requires a commitment to: ‘create new (task-related) knowledge, disseminate it throughout the organization and embody it in products, services and systems’ [9, pp. 229–230]. Obviously, producing, storing, retrieving and disseminating information does not have the same meaning as creating, disseminating and embodying knowledge. The two approaches are concerned with different aspects of the company’s life. Consequently, a description of a company from an IM and a KM point of view would emphasise different aspects. To illustrate this point let us consider a typical KM case, the Kao study of Nonaka [10, pp. 110–119]. Kao is the leading Japanese household and chemical products maker. The case-study focuses on how explicit and tacit knowledge are managed at Kao. It is remarkable that organisational culture, including the philosophical principles inspired by Buddhism of Kao CEO, Maruta, are addressed as relevant KM issues. In Nonaka’s description of KM activities meetings, conferences and other mechanisms which allow Kao employees to share their tacit knowledge with others are emphasised.

From this we can conclude that KM and IM represent two distinct management disciplines with many similarities but also with a number of significant differences. In fact, the two management disciplines are often integrated in practice. Building an in-house database containing project experiences is essentially an IM task but it can also be seen as a KM endeavour aiming to transform individual knowledge into collective.

The next question is how these differences between an IM and a KM approach are likely to influence their appropriateness as analytical tools? What difference would it make whether we used an IM or a KM approach? If, for example, we wanted to study QC it would certainly make quite a difference whether we chose an IM- or a KM-oriented approach. An IM approach allows us to identify information needs and flows but focusing on document storage and retrieval per se would not capture what is really interesting about TQM tools. What is really important about these tools is to examine how they influence organisational learning and individual learning processes. To what extent does the application of QC tools facilitate transformation of tacit knowledge into explicit knowledge? How do QC tools affect double-loop learning? These are examples of problems which are only properly addressed using a KM approach.

3. WHAT DOES MANAGEMENT MEAN?

What does it really mean to ‘manage’ knowledge? Different definitions exist. The following quotation from Marshall et al. [9, p. 231] indicates a rather narrow understanding of the term management, restricting it to formal activities: ‘Yesterday’s informal or tacit knowledge management techniques – the desktop, the hallway conversation, the memo, the trade show – are no longer sufficient in a period of radical change’. On the other hand in his Kao case-study Nonaka [10, pp. 110–119] obviously defines informal mechanisms and unstructured systems such as free access to information, open floor allocation, open meetings and fluid
personnel change as appropriate knowledge management efforts, although they all explicitly belong to what Marshall et al. call ‘yesterday’s informal or tacit knowledge management techniques’.

Nonaka’s extended management definition makes most sense as long as the mechanisms and support systems that are intended to assure sharing of information are systematic, based on deliberate planning, and not on laissez-faire. This point of view is also in tune with Davenport and Prusak: ‘Spontaneous, unstructured knowledge transfer is vital to a firm’s success. Although the term “knowledge management” implies formalized transfer, one of its essential elements is developing specific strategies to encourage such spontaneous exchanges’ [1, p. 89]. Thus a definition of management which includes the establishment of appropriate environments or infrastructures as an integrated part is applied in this article.

4. KNOWLEDGE MANAGEMENT PROCESSES

We will now proceed with identifying and specifying the basic KM processes.

The literature varies as to the number of processes and functions which make up knowledge management. Essentially, a KM function means something which can be done with knowledge at organisational level. Marshall et al. [9, p. 230] propose seven points:

- knowledge can be ‘generated’ from internal operations or R&D groups; it can be ‘accessed’ as it is needed from sources inside or outside the firm; knowledge can be ‘transferred’ formally before it is utilised, through training, or informally, through on-the-job socialisation; knowledge can be ‘represented’ in the form of reports, graphs, and presentations, enabling easier access; after its validity is ‘tested’, knowledge can be ‘embedded’ in processes, systems, and controls; and finally, these different knowledge processes can be ‘facilitated’, by the steady development of a culture, based on incentives and management leadership, that values, shares, and uses knowledge.

In comparison, Cook [11], writing about IM suggests that information passes through five stages: creation, communication, use, storage and disposal. These stages in many respects resemble the seven KM functions mentioned above. However, the terms obviously refer to quite different contexts and processes. Knowledge transfer is not the same as communication and ‘embedding’ knowledge in processes and systems has certainly a different meaning from ‘using’ information.

Marshall’s seven point list covers the basic KM functions. However, some additional but nevertheless important functions have been identified by Nonaka [10]. These include:

- recontextualisation (of explicit knowledge);
- reconceptualisation (of tacit knowledge);
- conversion (of tacit knowledge into explicit knowledge, and vice versa).

Recontextualisation occurs when different contents of knowledge generated in different parts of the company are mixed and recontextualised or recategorised into something more meaningful to the organisation at large. In Kao, explicit knowledge is recontextualised under five scientific key areas (fat and oil science,
This focus on sciences, instead of products, allows Kao to be in cosmetics and, at the same time, in computer floppy disks which are naturally related businesses from a surface science point of view. The process of recontextualisation clearly resembles what happens when you classify information, for example, in an academic library context. Is recontextualisation in Kao then nothing but a fancy new word for what is traditionally known as classification? Is what Nonaka emphasises as something special only what happens as a routine in all types of libraries? Is KM, consequently, rather a question of old wine in new bottles than of real conceptual innovation? In fact, there appear to be differences. First, recontextualisation in Nonaka’s sense of the word does not aim at facilitating access to documents and information retrieval as does traditional classification. Recontextualisation is rather linked to overall business goals and objectives and forms an integrated part of Kao’s organisational culture and values. Therefore, in spite of obvious similarities, it would be a simplification to claim that the two concepts, recontextualisation and classification, have the same meaning. The process of recontextualisation is related – but not identical – to switching between an individual and a collective type of knowledge [7, p. 74].

Reconceptualisation is used in connection with tacit knowledge where the tacit knowledge of a company is defined within the context of some basic concepts such as values, ethics, philosophical principles and the like. We could say that reconceptualisation concerns values and ethical issues whereas recontextualisation deals with facts and scientific evidence.

In Table 1, the concepts of Marshall et al. and Nonaka are merged into one integrative framework, operating with four key KM processes and sixteen KM sub-functions. The listing of these basic KM processes, however, only provides a partial understanding of the real purposes of KM. Desired results or goals must also be considered. Facilitating organisational learning, and unlearning, provides an example of a prominent goal. The distinctions made by Argyris and Schön [12] between single-loop, double-loop and deutero-learning are closely related to key organisational issues such as change, innovation and competitive advantage.

Organizational learning involves the detection and correction of error. When the error detected and corrected permits the organization to carry on its present policies or achieve its present objectives, then that error-detection-process is single-loop learning ... Double-loop learning occurs when error is detected and corrected in ways that involve the modification of an organization’s underlying norms, policies and objectives ... When an
organization engages in deutero-learning its members learn about previous contexts for learning. They reflect on and inquire into previous episodes of organizational learning, or failure to learn. They discover what they did that facilitated or inhibited learning, they produce these strategies, and they evaluate and generalize what they have produced [12, pp. 2–3, 27].

A common misunderstanding concerning the three types of learning is that double-loop learning should be preferable to single-loop learning and that deutero-learning represents the highest level. This may be true sometimes, but not always. The actual business value of a certain learning style is situation dependent. In fact, it can lead to disastrous consequences if established business principles and governing values are modified and changed as a result of double-loop learning. Sometimes error-detection facilitated by single-loop learning is the most rational choice.

Another important KM aim is to ensure transformation of knowledge from tacit to explicit knowledge and from individual to collective or social knowledge. The concept of tacit knowledge has been developed by the philosopher Michael Polanyi and refers to knowledge that resides in individuals. This knowledge is tacit because it can barely be described in words or reproduced in a document or database. Tacit knowledge simply cannot be represented effectively outside the human mind. Examples of tacit knowledge are the distinctive style of a master musician or the knowledge a creative research scientist uses to decide which line of inquiry to follow [1, pp. 70–72]. In some way the dimension of individual-collective knowledge is related to the tacit-explicit dimension because tacit knowledge always resides in the human mind of an individual. However, there are at least two kinds of individual knowledge: tacit knowledge which, by definition, cannot be articulated and individual knowledge which can be effectively codified and turned into, for example, a step-by-step check list or a report.

After these theoretical considerations we will now turn to an examination of TQM problem-solving tools as seen from a KM point of view.

5. A KNOWLEDGE MANAGEMENT PERSPECTIVE ON BASIC QC TOOLS

Total quality management (TQM) is a prominent management philosophy which has had an enormous influence on management thinking and practice in both the public and the private sectors since the middle of the 1980s. Although TQM emerged and developed during the same period when modern IT revolutionised business management, there are apparently few references to information management issues in the works of the quality gurus. Only a few scholarly works within the TQM field have seriously tried systematically to integrate IM thinking into TQM contexts. A good example of how TQM looks at information in comparison to other resources is given by Oakland [13, p. 14] in his general model of business and service processes. Oakland defines a process as the transformation of a set of inputs into outputs that satisfy customer needs and expectations in the form of products or services or – generally – results. His model lists nine inputs:

- materials;
- procedures;
- methods;
- information (including specifications);
Compared to other models depicting business processes, such as Porter’s value chain [14], IT and information management issues have obviously been given a rather low priority. This is astonishing because TQM is essentially a very information intensive management philosophy.

The explanation may lie in the influence of different governing paradigms or cultures among IM people and TQM professionals. TQM sometimes appears as a very people- and business process-oriented management philosophy emphasising values such as communication, culture and commitment, which differs from the more technical and system-driven world of IT experts and information system officers. Cronin, in an article on the importance of creating a new breed of hybrid information professionals, quotes Ouellette who says that: ‘many traditional IS heads pay only lip service to team building, empowerment, Total Quality Management and other important practices’ [15, p. 150].

Before we start to analyse how the application of QC tools influences KM processes, the basic QC tools should be briefly introduced. The following seven tools are often referred to as the ‘basic’ QC tools [16, pp. 6–67]:

1. cause and effect diagrams;
2. Pareto diagrams;
3. control charts;
4. check sheets;
5. histograms;
6. stratification;
7. scatter diagrams.

The purpose of the tools is to facilitate problem solving in teams [17]. Problem-solving teams are often called ‘quality circles’. Some of the tools are especially appropriate for identifying problems whereas others primarily serve problem analysis purposes. The check sheet, for example, is typically used to answer the question: How often are certain events happening? It is a useful tool when we need to gather data based on sample observations in order to begin to detect patterns. It starts the process of translating opinions into facts. Pareto and cause and effect diagrams, also called ‘fishbone diagrams’, are examples of tools which can be used for both problem identification and problem analysis. A Pareto diagram is a special form of vertical bar graph which helps to determine which problems to solve in what order; and it also helps to direct attention and effort to the really important problems. Pareto charts used with different measurement scales, such as frequency and costs, enable us to see that the most frequent problems are not always the most costly. For example, when we realise that shipping is the cause of 42% of all customer complaints but only accounts for 13% of the total costs, we have taken an important step towards identifying the really important problem. Pareto charts can also be used for problem analysis by measuring the impact
of changes made in a process or by breaking down causes into more and more specific parts.

Cause and effect diagrams build upon brainstorming techniques and utilise the knowledge of employees both to determine causes of problems and to identify adequate solutions. Such contexts may be termed knowledge-based decision making. Other tools, such as control charts, are primarily based on hard data and deal with identifying and eliminating special and common causes of variability. This context is called data-based decision making.

Behind QC tools lies the idea that the person doing the job is the most knowledgeable about that job. Therefore the tools are designed either to capture ideas and suggestions for improvements from employees and management or to be used for simple statistical analysis by staff with no mathematical background. The underlying philosophy is that the adversarial relationship between labour and management is counterproductive and outmoded. Other ideas behind the tools are that people want to be involved and to do their jobs well and that every person wants to feel like a valued contributor. Within the area of cognitive and learning aspects is a common belief that a structured problem-solving process using graphical techniques produces better solutions than an unstructured process and that graphical problem-solving techniques are an effective means of communication.

6. DISCUSSION

Looking at the functions of the basic QC tools from a KM point of view it is evident that they support the first of the four key KM processes, organisational knowledge creation. However, the relevant sub-function is certainly not acquisition. Acquisition as one of five modes of knowledge creation [1, pp. 52–67] refers to a situation where a company buys – or steals – expert knowledge from another company or from an individual. The application of QC tools, on the contrary, relies on the wisdom of the company’s own employees. The modes of dedicated resources, fusion and networks seem to be much closer to what is likely to happen when QC tools are applied. The concept of dedicated resources means that the company establishes units or groups especially for knowledge generation. R&D departments are the standard example. At first sight there seems to be a gap between an R&D department – based upon sophisticated and theoretical expert knowledge – and the pragmatic and down-to-earth problem-solving approach of quality circles. However, it has been recognised that quality circles essentially represent a scientific approach to work and in that case the analogy between the knowledge generation mode of dedicated resources and mechanisms of QC tools seems to make more sense. Fusion brings together people with different skills, ideas and values to work on a problem or project. This knowledge creation mode purposely introduces complexity and even conflict to create new synergy and creative solutions [1, pp. 59–62]. Differences in background, education and personal style within the problem-solving team prevent the group from falling into routine solutions to problems. However, there are different opinions as to the extent to which the application of QC tools really supports knowledge generation through fusion. One sceptic is Miller [18, pp. 105–118], who asserts that the QC analytical and statistical techniques are insufficient to foster creativity and innovation. In his
reasoning he distinguishes between ‘leaping’ and ‘incremental’ innovations: ‘The actual use of these analytical, statistical techniques as leads-in to idea generation usually emphasizes incremental improvements. Leaping changes tend to emphasize starting with intuitive insights, followed by factual verification. Incremental improvements tend to emphasize starting with factual information, which provides fertile ground to subsequently produce intuitive insights’.

Miller makes another interesting distinction between four strategies or styles for finding creative solutions to work challenges: visioning, modifying, experimenting and exploring. He states that ‘eighty percent or more of the techniques for TQM fall into the two strategies of modifying and experimenting’ [18, pp. 113–114]. If we follow Miller’s argument, it seems that the application of QC techniques even to a limited extent contributes to knowledge generation through fusion. The knowledge generation mode which most adequately describes what is happening when QC tools are used is probably dedicated resources.

Turning to the next of the four key KM processes, accumulation, it is certain that codification processes take place when QC tools are used. The use of cause and effect diagrams which are based upon structured brainstorming is especially likely to support knowledge codification by bringing individual and unstructured work experiences and private knowledge into a form which is more organised, explicit and easy to understand. Cause and effect diagrams are likely to help companies to capture the rich knowledge that resides in individuals and to represent that knowledge effectively through the use of visualisation techniques. Also, recontextualisation of knowledge, in Nonaka’s sense of the word, is probably stimulated by the use of cause and effect diagrams. If a company wants to improve a certain business process relevant knowledge on causes of dysfunctions can exist in different parts of the company. The structured brainstorming technique of the cause and effect diagram helps to recontextualise these fragmented and isolated pieces of knowledge into a cause and effect relationship which is more meaningful to the company in its efforts to improve its business processes. But what is the influence of QC tools on tacit knowledge? To what extent are these diagrams able to codify effectively that very special – but important – kind of knowledge characterised by being not articulated and not articulable at the same time? During a brainstorming session it is evident that not articulated knowledge is being articulated and made explicit. But what about the not articulable tacit knowledge? It is believed [1, p. 71, 81] that codification of tacit knowledge in organisations is generally limited to human interaction and pictorial representations. Since cause and effect diagrams combine verbal with visual representations – the diagram – and because of the human interaction between the members of quality circles, it is probable that tacit knowledge – to a certain degree – can be codified through the use of QC tools. It is also likely that cause and effect diagrams are suited, at least, to specifying and mapping tacit knowledge although they may not be able to represent its content effectively.

Knowledge sharing is the third of the four key KM processes. Sharing of knowledge in a company is certainly facilitated by the preceding process of codification. In principle, the use of QC tools by teams seems to be an ideal method of knowledge transfer but in the real world there are a number of inhibitors – or frictions – that slow or prevent it. These frictions are primarily related to cultural
factors and to different vocabularies and frames of reference. Davenport and Prusak emphasise: ‘When you need to transfer knowledge, the method must always suit the culture’ [1, p. 93]. The application of structured and team problem-solving tools certainly meets with barriers. In fact, the quality circle idea – originally invented in Japan – has not been particularly successful in western companies [19, p. 30]. It is widely recognised that the idea failed because of the lack of quality organisational culture, and the absence of training in team and problem-solving skills. An additional cause may be a narrow idea of productive work, based on outdated theories of the nature of work, which explains why many managers do not allow enough time and meeting places for knowledge transfer [1, p. 97]. As to the importance of different vocabularies and frames of reference, it is obvious that QC tools support the creation of a common, problem-oriented understanding across disciplines, domains and professional boundaries through the use of simple graphics and concepts. However, precisely because of this transparency and openness the application of QC tools may appear threatening, especially to people wishing to protect their professional “turf” and status [19, p. 180].

In summary, QC tools can be judged as an effective means to organisational knowledge transfer, although their friction-free functioning depends on how management deals with internal resistance based on cultural factors.

Finally, we have reached the exploitation of knowledge which is the last of the four key KM processes. To embed knowledge in new technologies or organisational structures and processes obviously means more than the mere storing of documents in libraries, manuals, databases and other deposits. Both processes, embedding and storing, certainly have much to do with formalisation. Indeed, to express the exact difference is difficult. Embedding knowledge is a way of consolidating knowledge gains and is typically done by modifying existing routines, standards and controls according to the new knowledge. As an everyday example, we embed new knowledge into an existing routine whenever we add comments to a recipe as a result of experiences gained in the kitchen.

There seem to be two principal ways of embedding knowledge depending on the type of organisational learning. In a single-loop learning context embedding is primarily associated with the modification of existing routines and standards to achieve better results. When the learning style in question comes closer to double-loop learning, embedding of new knowledge means more than modifying existing routines; here it involves profound changes in values, beliefs and paradigms. The process of knowledge embedding thus includes both the context where new knowledge is built into processes and routines, and the more subtle context where new knowledge, gained through double-loop learning, is added to, or substitutes for elements of, existing organisational values and beliefs.

Another important aspect of knowledge exploitation is the testing of that embedded knowledge and the assumptions on which it is based [9, p. 245]. Testing is future-oriented, being invariably followed by redesign and re-engineering to alter the knowledge embedded in organisational structures and processes. An incentive for generating new knowledge is hereby reached and the knowledge management cycle closed.

The QC tools in question do not seem to contribute directly to embedding new knowledge into either routines or profound beliefs and values. This conclusion is
not surprising since QC tools are intentionally thought of as techniques for problem identification and solving and not as organisational implementation tools. For such purposes TQM offers other interesting alternatives such as the PDCA (plan-do-check-act) cycle, the Juran Quality Planning road map, etc. [16].

What is the importance of QC tools as seen from an organisational learning perspective? Are they, for example, effective as levers to assist double-loop learning? It has been recognised through theoretical considerations and practical experience [20, p. 292] that the key to double-loop learning lies in making mental models more explicit. The question could then be reformulated to ask to what extent QC tools support the aim of making mental models explicit? It is doubtful that these tools aimed at problem identification and solving do perform such a function apart from as a general side-effect of the team-work approach. It is the organisational learning literature that offers a number of interesting approaches and techniques to deal with mental models [20, pp. 235–296].

7. CONCLUSIONS

Based upon the considerations presented above a number of observations have been made. First, it seems that the most recent KM literature provides several useful concepts concerning KM processes although there still seem to be a lot of terminological and conceptual inconsistencies. Second, concepts which seem easy to grasp intuitively when reading about the illustrative examples and cases presented in the KM literature are comparatively more difficult to handle when applied to one’s own examples such as QC tools. This observation indicates that there is still a lot of work to be done in respect of conceptual clarification. Third, in spite of the observed conceptual difficulties KM concepts seem to work well in a managerial context in that they make good sense both as evaluation tools and as vehicles for creating new questions and wider horizons. Fourth, as a consequence of observation number three, it is likely that the proposed KM processes could offer a common framework and vocabulary for managers and information managers alike by creating a balance between the soft, conceptual and somewhat abstract world of organisational learning and the technology-centred approach to KM.

The initial question of this article concerned the extent to which the application of total quality management problem-solving tools was likely to influence key knowledge management processes. The theoretical analyses revealed that the use of QC tools in a company would certainly influence key KM processes. The aim of the article was furthermore to specify how the different KM processes were influenced. Here the results of the theoretical considerations indicated that the use of QC tools is likely to facilitate the first three of the four key KM processes, i.e. knowledge creation, accumulation and sharing, whereas knowledge exploitation did not seem to be particularly influenced. A number of related questions were also dealt with especially relating to creativity and innovation and organisational learning. Here, it was found that it cannot be proved that QC tools are likely directly to support creativity, innovation and double-loop learning. This conclusion is not surprising considering the main purpose of QC tools which is to improve existing products, services and processes.

As a supplement to these theoretical considerations, it was also observed that it is highly meaningful to analyse knowledge management and information man-
agement issues as two independent management disciplines with KM operating in a quite different way from IM. Consequently, management must see knowledge in a much wider sense than that of document storage and retrieval per se. The story of the very few and weak contacts and relations between the development of the quality movement in the 1980s and the information management disciplines in the same period indicates that the evolution of an independent KM discipline represents a significant step towards raising the awareness of information and knowledge issues among business managers. The shift from documents to discussions mentioned in the opening quotation by Davenport and Prusak thus also reflects a shift on the theoretical level from document- and retrieval-oriented IM to business process- and learning-oriented KM.

REFERENCES


(Revised version received 24 June 1999)