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Do TQM principles need to change?

Learning from a comparison to Google Inc.

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Total Quality Management (TQM) is recognized for emphasizing customer needs and contributing to organizations' efficiency and effectiveness through process orientation and continuous improvement. Previous research has highlighted the risk that TQM might impede firms' ability to innovate and quickly adapt to changes, especially in rapidly changing environments. However, other researchers have concluded that some of the best practices of innovation management could be recognized as TQM elements. A recurring issue concerns the conceptualization of TQM that is contributing to ambiguity, as there are various definitions. The question of whether TQM supports innovation or not is therefore unsettled. The purpose of this paper is to compare Organizational Characteristics for Continuous Innovation (OCCI) in rapidly changing industries with key TQM Principles in order to discuss the relationship between TQM and continuous innovation. The OCCI used for the comparison have been generated through an empirical study of Google in combination with a literature review of research on continuous innovation in fast-changing environments. A comparison with the OCCI reveals that there are many similarities with TQM principles but also some distinct differences, e.g. in terms of orientation towards innovation. While TQM has become closely related to process orientation, OCCI are more related to semi-structure and ambidexterity. The conclusion is that TQM needs to change in order to also support continuous innovation. In order for TQM to contribute both to continuous improvement and continuous innovations, a partly new management paradigm is needed. However, even if TQM is changed, the brand 'TQM' is still associated with 'quality' and 'continuous improvement'. A re-branding strategy might therefore be necessary.

Keywords: Google, TQM, continuous innovation, dynamic capabilities, management innovation, corporate culture, ambidextrous organization, open innovation

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Introduction

Total Quality Management (TQM), has its roots in Japan, inspired by the work of US contributors (e.g. Shewhart, Deming, Juran and Feigenbaum) and by the contributions of Japanese researchers (Ishikawa, Akao, Kano) and TQC² practices in industry, not least by the success of Toyota and its “Toyota Production System” (TPS). In the late 1980s, TQM was launched as a management concept that included quality of all issues in an organization. TQM now became the responsibility of management³ and required the involvement of all employees. TQM has since primarily been recognized for emphasizing customer needs and contributing to organizations’ efficiency and effectiveness through process orientation and continuous improvement.

Research literature focusing on continuous innovation in rapidly changing industries found that organizations which are to survive long-term need to be highly adaptive and innovative in parallel with being efficient (Brown & Eisenhardt, 1997). However, previous research has pointed at the risk that TQM might impede firms’ ability to innovate and quickly adapt to changes, and especially so in rapidly changing environments (Sitkin et al. 1994; Benner & Tushman, 2002; Cole & Matsumiya, 2008). The reason is that as the environment becomes more uncertain it “...is expected that the basis of competition will also change with quality becoming one of the ‘qualifying criteria’ and flexibility, responsiveness and particularly innovation taking over as ‘winning order criteria’” (Prajogo & Sohal, 2001, p. 539).

2 In Japan the concept TQC (Total Quality Control) was used – sometimes described as ‘Company-Wide Quality Control’. However, in the US the concept TQC had a different and more limited connotation and hence, in the late 1980s the term TQM (Total Quality Management) was launched.

3 According to Ishikawa (1985, p. 19) “Dr Juran’s visit (in 1954) marked a transition in Japan’s quality control activities from dealing primarily with technology based in factories to an overall concern for the entire management. There is a limit to statistical quality control which has engineers as its prime movers. The Juran visit created an atmosphere in which QC was to be regarded as a tool of management, thus creating an opening for the establishment of total quality control as we know it today.”

However, other researchers claim that some TQM practices are conducive to innovation (e.g. Antony, 2007) and it has even been argued that some of the best practices of innovation management could be recognized as TQM elements (Prajogo & Sohal, 2001). A recurring issue in the research literature, which contributes to ambiguity, concerns the conceptualization of TQM and the fact that there are various definitions. The question of whether TQM supports innovation or not is therefore unsettled.

The purpose of this paper is to compare Organizational Characteristics for Continuous Innovation (OCCI) with key TQM Principles in order to discuss the relationship between TQM and continuous innovation. The OCCI used for the comparison have been generated through an empirical study of Google (Steiber & Alänge, 2012).

The paper is organized in the following way. First, the method chosen for the study will be presented. Second, we will proceed with a literature review on both “TQM literature” and “innovation literature”, where the latter focused on criteria for continuous innovation in fast-changing industries. Third, we will present the main organizational characteristics behind Google’s innovativeness. Fourth, these OCCI will be compared with key principles of TQM. Fifth, conclusions will be presented, followed by suggestions for future research.

Methodology

The methodology chosen was a literature review in combination with a single-case qualitative study on Google⁴. Literature on the development of, and potential criticism of, TQM was reviewed, as was selected literature on continuous innovation in rapidly changing industries.

⁴ Google Inc. was selected as the company is well known for continuous innovation and is active in the rapidly changing Internet service industry.

The qualitative study was based on twenty-eight interviewees, conducted at Google over an eight-month period in 2010. Most of the interviewees were at a director level, 25% were women, and collectively the interviewees covered several functions, product areas, and geographical regions, although the majority was located at the HQ in Mountain View. The interview guides were semi-structured with open-ended questions. At the end of each interview, the interviewees were asked to rank and then describe seven organizational elements⁵ according to their relative importance for Google's innovativeness. The procedure provided the basis for the development of Google's organizational characteristics for continuous innovation (OCCI).⁶ The research team used a grounded-theory-inspired approach for the analysis⁷.

Literature Review

While TQM of the 1990s gradually evolved into a quest for 'Excellence', industry in general is today increasingly realizing the need for continuous innovation. Hence, there is a need for a review of the TQM and the Innovation research field.

Although product development was seen as a focus area of TQC in Japan in the late 1980s (Alänge et al. 1987), Western TQM scholars were in the early 1990s primarily interested in quality systems, process management, empowerment, continuous improvement and customer orientation (Dotchin & Oakland, 1992). In addition, there was a specific interest in the methods and tools for customer understanding that had been developed in Japan (e.g. Kano Model – Kano et al. 1984; QFD–Akao, 1990). During the latter part of the 1990s there was a

⁵The interviewees were given the opportunity to add new elements, although none chose to do so.

⁶The empirical analysis of Google data resulted in one of the pre-defined organizational elements (Management & Leadership) contributing to two distinct organizational characteristics ('Top management & Board' and 'Facilitating leadership').

⁷ Dubois & Gadde (2002) provide a close resemblance to our methodological approach.

shift towards business excellence that led to a broader and more holistic view of TQM, in parallel with a contradictory tendency where a focus on measurement and the use of statistical methods gave path to a Six Sigma boom (Dahlgaard-Park, 2011).

Initially researchers' conceptualization of 'excellence' did not necessarily include innovation (e.g. Kanji, 1998). However, in 1999, two articles argued for the importance of integrating business excellence and innovation management. Martensen and Dahlgaard (1999) suggested the use of an extended PDSA cycle, where the first loop was a more traditional 'Hoshin planning' cycle of integrating innovation into a general business strategy, while the second loop focused on building a culture of learning and creativity, and Dahlgaard and Park Dahlgaard (1999) elaborated upon the importance of developing a culture for innovation, creativity and learning, using Pioneer DK as an empirical illustration.

In the 2000s there was a renewed focus on learning from Toyota and its TPS, and Lean Production gained momentum (e.g. Liker, 2004). At the same time, learning and innovation were gradually built into excellence models such as EFQM and MBNQA (Dahlgaard-Park, 2011). Dahlgaard-Park and Dahlgaard (2008) developed a methodology and a measurement instrument for diagnosing innovation excellence, built upon the European Excellence Model (EFQM). They view both 'customer culture' and 'innovativeness' as important enabling factors. However, both components are seen as leadership sub-factors, since they consider it a management responsibility to build an innovative culture, with norms and values that support innovation and new product development.⁸ They also argue that the first step in any excellence strategy is "to build quality into people", which includes both understanding

⁸ In line with their TQM background, they see culture as a result of intentional long-term activities from the top level, which should be part of a yearly strategy and deployment process according to a Hoshin-Planning methodology ('policy deployment').

people deeply and striving to develop and/or recruit people, including leaders, with the right values and competences. In a similar vein, Matias and Coelho (2011) argued for the importance of integrating an innovation management system into the pool of already integrated management systems, forming what they called an “Integrated Total Quality Management”.

There has been an on-going discourse based on the perceived dichotomy between knowledge exploitation and exploration (e.g. March, 1991). TQM as well as business excellence has primarily been seen as linked to efficient exploitation of existing knowledge, and hence there has been worry about a negative impact on radical innovation in the dynamic high-tech sector by the pursuit of quality improvement (Cole & Matsumiya, 2008). This concern was raised by Sitkin et al. (1994), who found that TQM was not well suited to conditions of high task uncertainty. They used an uncertainty-based contingency perspective on TQM effectiveness and argued for the need of a different way of organizing for uncertain settings, e.g. in industries with rapid product life cycles. Benner and Tushman (2002) studied the effect of process management⁹ and found that it contributed to an increased emphasis on exploitation, ‘crowding out’ more exploratory forms of innovation, resulting in less radical innovation.¹⁰ One important reason identified for this focus on exploitation was an increased use of routines and ‘best practices’ – with the purpose of speeding up the product development process by limiting process variation. In addition, the use of efficiency and effectiveness measurements, focusing on short-term benefits, primarily spurs continuous improvement. While a rapid exploitation may be beneficial when the environment is stable, Benner and Tushman (2002) found that it might impede necessary adaptations to changes in the environment, such as a

⁹ Seen as an essential component of TQM.

¹⁰ Benner & Tushman (2002) conducted a longitudinal study of two industries, paint and photography, and measured ‘process management’ in terms of ISO9000 certificates and ‘exploitative vs. explorative’ innovation in terms of patents related to or outside of previous company knowledge.

technological transition in an industry. Benner (2009) further underlined process management's negative impact on incumbents' responsiveness and adaptation to major technological change¹¹. However, other authors claimed that at least some quality approaches could be advantageous to innovation, e.g. Six Sigma (Antony, 2007). There is also some empirical evidence that it is possible to combine continuous improvement with innovation under a philosophy of TQM or Lean Production (Irani & Sharp, 1997; Boer & Gertsen, 2003). Bessant and Caffyn (1997) argued for the importance of extending participation in innovation processes and state that continuous improvement can be seen as "an organization-wide process of focused and sustained incremental innovation".¹² In addition, Prajogo and Sohal (2001, p. 541) concluded that some of the best practices of innovation management could be recognized as TQM elements. On the other hand, in another study, Six Sigma was found to be severely limiting the innovativeness of 3M, a company that for decades was considered one of the most innovative (Garud et al., 2011). In addition, Cole (2002, p. 1056) stressed that the generation of error, which is part of 'probe-and-learn' processes for discontinuous innovation (Lynn et al. 1996), "is a special challenge for the quality discipline ... that has grown up viewing deviance and error as the enemy". Thus, the question of whether TQM supports innovation or not is unsettled, and this calls for a further need of researching specifics beyond the broad concepts, as well as the relationship between TQM and continuous innovation.

If we now turn to innovation literature focused on organizational requirements for continuous innovation in rapidly changing industries¹³, some of the main focus areas have been: exploring practices (Brown & Eisenhardt, 1997, 1998) and capabilities (Leonard-Barton,

¹¹ In this case, measured as introductions of new digital cameras in the photography industry.

¹² They comment that these higher levels of participation in innovation activities have been recognized in a number of fields, such as 'lean manufacturing', 'total quality management', and 'learning organizations'.

¹³ Studies have been conducted on industries such as Information Services, Semi-conductors, and Telecom services.

1992; Teece, 2007) needed for continual renewal and discontinuous innovation (Lynn et al. 1996); how to simultaneously manage exploration and exploitation (Tushman & O'Reilly III, 1997; Tushman et al., 2010); how to create and sustain corporate models/organizations for continuous innovation (Garud et al. 2011); and balancing the external knowledge and innovations needed internally with the exploitation of internal knowledge and innovations externally, i.e. 'open innovation' (Chesbrough, 2003). The shared assumption among the selected researchers is that competitors and new entrants are catching up on firm-specific competitive advantages increasingly quickly. For this reason existing companies need to build a high capability to change and renew their organization, to frequently produce radical innovations in parallel with operational excellence, and to be open for knowledge, ideas and innovations from everywhere in order to effectively capture innovative opportunities both externally and internally in the firm. How well do these characteristics fit with the principles of TQM?

The next section will present the main organizational characteristics of a company that is highly innovative and also active in the rapidly changing Internet service industry.

The case of Google¹⁴

Over the last decade, Google has been viewed as one of the world's most innovative companies.¹⁵ The story of Google is about how one company has built an organization which both encourages and sustains a high level of innovativeness. Based on interviews at Google, eight critical organizational characteristics for continuous innovation (OCCI) were identified:

¹⁴ The case of Google is presented in more detail in Steiber (2012) and Steiber & Alänge (2012).

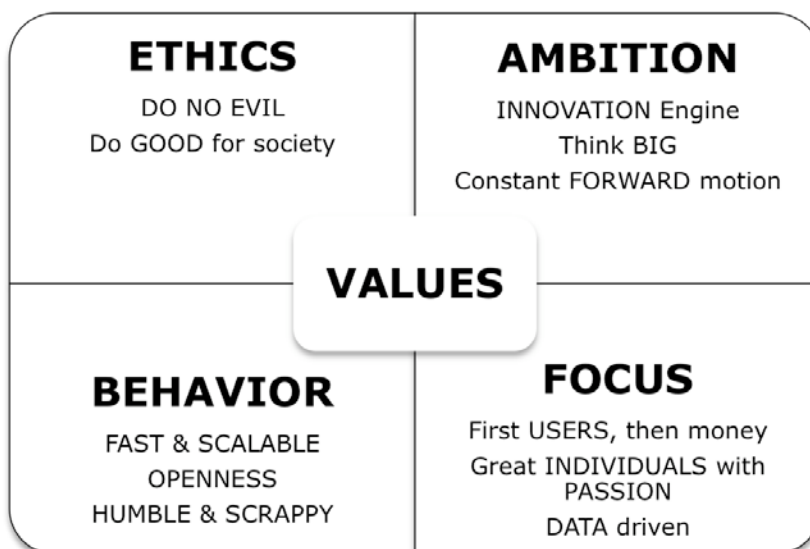
¹⁵ By 2010, only 12 years after it started, Google had been the world's most valuable brand for four years in a row (BrandFinance Global 500, 2011). This was based on the initial innovation 'Search' and a following stream of new innovative products and services such as: Adwords, Gmail, Maps, Earth, YouTube, Android, Google+.

an innovation-oriented & change-prone top management and board; an innovation-oriented & change-prone culture; competent & committed individuals with a passion to innovate; leaders that empower, coach and remove obstacles for innovation; a semi-structured and ambidextrous organization; innovation-oriented performance and incentive systems; continuous learning; and open innovation (Steiber & Alänge, 2012). Below, these key organizational characteristics behind Google’s innovativeness will be presented.

A culture that fosters radical innovations and constant renewal

The culture was a factor that almost everyone interviewed considered to be crucial for explaining Google’s innovativeness. Google’s culture was innovation-oriented and change-prone. The core values are categorized according to four main dimensions in Figure 1 below. The essence of the culture was captured in the term “Googley”, which indicates that an individual is behaving and acting according to the company’s values. The employees used this term as a daily evaluation and ‘correction tool’ in day-to-day activities, in the hiring process as well as in the performance & evaluation systems.

Figure 1. Google’s key values, according to interview data (Steiber & Alänge, 2012)



Competent individuals with a passion to innovate

Most interviewees regarded the individual as the second crucial explanation for Google's innovativeness. In order to hire the right individuals and further optimize their capabilities, Google had created special processes for hiring, socializing, and following up of the satisfaction of their employees.

Google's employees were diverse in order to foster innovations. Even if they were diverse, they all had certain common characteristics such as: high cognitive capability, being entrepreneurial, having a passion for technology and Internet, and being 'Googley'. In order to emphasize the importance of employees, one of the founders, Larry Page (the present CEO), reviewed the internal evaluation of each potential employee before he/she was hired.

Through a systematic socialization process the new employees were introduced to the Google culture. In order to listen to the employees, Google used an annual employee survey, which included questions on innovation. Each manager then received the result in a tailored manager report.

Leaders as facilitators and top management as the foundation

Leadership was considered important for explaining Google's innovativeness, but the expressed focus on the culture and the individual led to an interesting divide in how interviewees viewed the importance of leaders. Some viewed the company as mainly self-organized and emphasized the culture and the creative individuals, while others considered leadership to be very important for creating an environment in which creative individuals can excel. Leaders were to act as facilitators in innovation processes, and as cultural ambassadors and connectors (meaning they should quickly absorb and diffuse information from other parts

of the organization to their team). Leaders should empower their employees, trust and support them in new projects, and remove obstacles for innovation. They were also, however, to set the vision and direction for their teams and make the teams' role clear in the organization. Once a year, each leader's direct reports evaluated their leader against eight good habits in an evaluation program. In addition, leaders received 360-degree feedback from their direct reports in regular performance evaluation meetings. A Great Management Award had been established and a bottom-up process was used to nominate the candidates.

What all interviewees were in agreement about was the importance of an innovation-oriented and change-prone top management and company board, providing a foundation for Google's long-term focus on radical innovations. The innovation culture and the process for selecting and developing competent individuals had been initiated and continuously supported by the founders, top management and the board. They were also behind the driving mission of organizing the world's information and creating a better world for users that functioned as a strong impetus for innovation.

Semi-structure, heuristics/incentives and continuous learning

Organization was considered important, but primarily because of its absence of policies, structure, and processes. Google has tried to keep a mindset of a small company by actively and consciously avoiding bureaucracy, keeping the organization flat, and minimizing formal processes. Google has sought to develop a semi-structured organization in order to allow both continuous improvement and continuous innovation.

Google did not use any separate department for new innovative initiatives. Instead, it was frequently commented, "...you can't institutionalize innovation". The common view was that it was not possible to appoint a formal manager responsible for innovation, or to formalize the innovation process, including formal measurements. Instead, ideas were believed to come from anyone and everywhere in the organization and the innovation process was primarily a bottom-up process. However, in parallel with ideas coming from the bottom up, clear goals and priorities came from top down.

Google had encouraged its employees to strive in a desirable direction through a combination of a soft system and formal processes. The soft system includes Google's mission and innovation-oriented company values. In addition, Google used a number of heuristic rules that effectively directed everyday work, e.g. the 70-20-10 percent rule¹⁶ that emphasizes focus on both innovations and operational efficiency. The formal processes included the processes for setting key priorities and for evaluating, compensating and promoting employees. The process for evaluating and compensating was innovation-oriented and interlinked with the promotion process. Twice a year, each employee was reviewed and potentially promoted through a peer review method. According to the interviewees, Google used primarily two types of incentives for innovation. The first was explicit awards and spot bonuses. The second was to provide opportunities for intrinsic motivation through the work itself and through the possibilities to realize one's own ideas, e.g. through '20% own time'.

The element "Organizational Learning" was not seen as a key explaining factor for Google's innovativeness. The reason was that many interviewees regarded learning as more important

¹⁶"You never get enough time at Google – we focus 70% on big core, 20% on areas close to core and 10% on very different things."

for improvements of current products and processes than for new innovations. Another reason was that Google did not have formal systems for organizational learning (except that Engineering had processes for experimenting and learning from rapid innovation cycles). Instead learning was part of Google's mindset and was a natural part of regular work (here labeled 'continuous learning'). Google's 'learning system' could therefore be seen as sharing information by being open in various meeting places for serendipity encounters, and through internal networks. In addition, Google Search was a means for learning from all kinds of internal experiences that had been documented. Learning took also place in external networks, e.g. with experts or lead customers.

Openness for external ideas and innovations

External interaction was viewed by many as not playing an important role in explaining Google's innovativeness. However, after some further investigation it was clear that Google acted as an open system with organizational units such as 'University Relations', 'Google Venture', and 'Corporate Development' to scan the environment, arrange collaboration agreements, invest in and acquire new technologies.¹⁷ Google's future growth will likely continue to depend on both internally and externally generated innovations.

Discussion

The purpose of the discussion is to make a comparison between organizational characteristics for continuous innovation (OCCI) and principles for TQM. First, the OCCI based on the empirical findings from the Google case will be summarized. Second, there is a discussion of different ways of conceptualizing TQM and a presentation of the conceptualization used for

¹⁷ Similar to the principles behind 'open innovation' (Chesbrough, 2003).

the comparison in this section. Finally, the key principles of TQM will be compared to the OCCI, and the implications for TQM will be elaborated upon.

Key organizational characteristics of Google

In our empirical study of Google, eight organizational characteristics for continuous innovation (OCCI) were identified (Steiber & Alänge, 2012). The *top management and the board* were innovation-oriented and change-prone, and were the foundation for the long-term commitment to radical innovation. Google had a strong *corporate culture* that fosters radical innovations, but also constant renewal. The *individuals* in the organization were the key assets for innovation. They were not only competent but also entrepreneurial and had a passion to innovate. *Leaders* in general acted as ambassadors and facilitators for innovation, and were expected to coach and empower their employees in their work to accomplish both innovation and operational excellence. The *organizational structure* was semi-structured and ambidextrous and was primarily supported by *heuristic rules and intrinsic incentives*, combined with a formal process for *goal-setting and performance review*. *Organizational learning* was a natural part of Google's mindset and regular work. Finally, the organization acted as an *open system* and Google's senior management had established several units with responsibility to complement the internal innovation processes. This allowed the company to better sustain its ability to be innovative by utilizing innovations that originate both internally and externally.

Most of the organizational characteristics identified at Google have been identified as important also by other researchers that have focused on continuous innovation in rapidly changing industries (Steiber & Alänge, 2012). This is even more interesting in the light of the

assumption that previously mature industries will move towards more dynamic conditions, which in turn will create a pressure on continuous innovation (e.g. Chesbrough, 2003; Matzler et al., 2010). If this assumption is correct, the identified OCCI at Google may be needed in most firms and organizations in the future. In the next section, the key principles of TQM will be discussed in the light of the OCCI of Google.

The principles of TQM

Before we can compare TQM with the findings from Google, we need to discuss what variant of the TQM concept we are going to use in our analysis. As has been mentioned before, there is no single definition of what constitutes total quality management. Different variants have been used and over the years there have been diverse attempts to standardize the content of total quality (e.g. MBNQA 1987-2012). Since the 1990s, there have been mainly two development trajectories for the TQM concept, namely TQM as a broader and more holistic concept, and TQM as a more narrow concept focused on measurement and the use of statistical methods (Dahlgard-Park, 2011). In order to contribute a relevant and useful analysis of TQM in the light of Google, we here choose to use the “broader and more holistic” TQM concept in our comparison. Once we have analyzed the differences and similarities between this “broader” TQM concept and Google, we can turn our focus to what effect this will have on a more “narrow” form of TQM.

In Japan, the content of TQC (which forms the basis for the “broader” TQM concept) had evolved through a pragmatic process where industry, e.g. Toyota, tested and evaluated different approaches which gradually became part of a broad and evolving ‘national standardization’ of TQC, e.g. Ishikawa (1985) or JUSE (1987). Thus, we have chosen to use

the model developed by Alänge (1994) which was derived from empirical data¹⁸ from a number of companies considered to be early adopters of the TQM approach in Europe and in the USA combined with data from leading Japanese companies, and supplemented by a review of definitions used by quality awards and a review of literature on total quality. The result was a TQM that on a conceptual level consisted of: “...*systematic management principles that make the best use of all resources. The key...is that the potentials of all employees should be used to achieve demanding goals, set by a committed top leadership, and built on customer requirements. These demanding goals...require changes in organizational and reward principles*”. TQM was further based on six main principles: customer focus, visible leadership, total approach, process focus, continuous learning and standardization for creativity.¹⁹

Google OCCI versus principles of TQM

When comparing the principles for TQM, there are interesting similarities and differences with the organizational characteristics of Google. Like in TQM, capturing the potential from all employees was a key principle at Google, as was a committed top leadership. However, the demanding overall goal was different than in the case of TQM, ‘changing the world through radical innovations’ instead of goals built on ‘customer requirements’. Google wanted to make life better for users through radical innovations that most customers couldn’t

¹⁸ Another possibility could have been to use a Japanese-inspired version of TQM (e.g. Shiba et al. 1993) or “Western translations” such as the US MBNQA or the corresponding European version by EFQM.

¹⁹ This definition of TQM is based on what pioneering Western companies tried to accomplish in the early 1990s. These companies’ view of the meaning of customer focus, leadership and empowerment is not necessarily identical to TQM versions that were practiced in other Western companies during the 1990s. The latter were primarily characterized by a process focus and continuous improvement and by, in addition, omitting part of the learning aspects and standardization issues that were central for Japanese role models, such as Toyota, and which were seen as essential in the pioneering firms.

even imagine yet.²⁰ Each of the main principles of TQM will now be discussed regarding how they compare with the characteristics of Google.

Customer focus includes things such as: "...understanding the customer's demands and needs, and make this a leading guideline to direct strategies and actions of the company". It covers both internal and external customers, customer segmentation, and systematic data on customers' needs and expectations. At Google, the users are one of the guiding stars but the main focus is not to fulfill all their needs but to proactively change the world in a way that makes it better for the users. Listening too much to the current customers' needs, according to Google, creates a risk of becoming only incrementally better in its products and services. Instead Google aims at identifying the issues not yet solved, which can lead to radical innovations.

The main roles of **Visible Leadership** in TQM companies are to set the vision, set a few but challenging goals, deploy goals to all levels in an organization, coach the people and create an environment in which team players develop, and make it possible for all employees to make use of their brains (e.g. empower them). Empowerment is further built on the assumption that the person closest to a specific process has most knowledge about that process. These roles are very similar to the leaders' roles at Google. The differences are in the goals that are set and that Google also uses a bottom-up process for setting goals.²¹

According to the **Total Approach**, quality is the responsibility of everyone inside a company.

Further, mutual development takes place between the company and its suppliers and key

²⁰However, TQM's Kano-inspired view of also "exceeding customers' expectations in some areas valued by the customers" opens up for innovations beyond what customers/users ask for.

²¹ There is however a similarity in terms of advocating very ambitious goals, but in TQM these goals concerned lowering the amount of defects (Six Sigma) or shortening lead time (Alänge, 1992).

customers. The company is also expected to be open and share its experiences with other companies and to have a long-term perspective and take societal responsibility outside what is demanded by law. Again, several similarities with Google could be identified. For example, innovation is the responsibility of everyone. Further, it acts as an open organization with both mutual development with e.g. suppliers, but also an openness towards new external innovations. Google also emphasizes the importance of “Don’t do evil” and taking responsibility for issues in the society. As part of this, it strongly emphasizes the importance of being environmentally friendly in its business operations.

Continuous Learning in the TQM concept includes both components such as continuous improvement and a culture, processes and methods for organizational learning. Again leadership and a clear vision were crucial in order to direct everyone towards common goals. Employees are trained in methods such as the PDCA cycle, 7 QC/management tools, and process mapping. Employees are also expected to share learning between different units and groups and, further, to use benchmarking and audits as learning tools. They are also expected to cross-functionally rotate over the years. Compared with the findings from Google, innovation but also learning and continuous improvement were built into the culture.²² The employees at Google were expected to share as much as possible and never to be satisfied with the status quo. They were also expected to rotate at least every 18 months. They did not have any formal processes for learning and continuous improvement and they did not seem to use specific methods and tools for problem-solving. However, ‘probe-and-learn’ processes directed towards different user groups are routine in new product development in order to both surface errors early and to choose between different product concepts (Brown & Eisenhardt, 1997; Cole, 2002).

²² As was also suggested by Dahlgaard and Park Dahlgaard (1999).

Process Orientation is to see the work as a large number of work steps that are going across the organization. The processes could be business or support processes and should be analyzed in the way they really are done and with the intention of maximizing value for customers and removing non-value adding activities. This way of looking at an organization is quite different from the semi-structured model Google used. Process orientation was viewed at Google as a typical sign of a large company and as something that could impede innovation. Formal processes were therefore kept at a minimum and instead they were replaced with a clear vision, goals and heuristic rules. This did not mean that the employees didn't follow a certain structure when they performed a task, but the processes were less formalized, which is why the employees could keep being self-organized within certain limits.

Finally, **Standardization for Creativity** "...concerns both the content and the way this content is diffused and put into use within a company". There have been several attempts to standardize the concept of 'TQM' by standardizing organizations, such as JUSE in Japan and NIST in the US. Methods (e.g. PDCA, policy deployment) and tools (e.g. 7QC and 7 management tools), as well as the approach for training and development of personnel, have also been standardized in many 'TQM companies'. In comparison, the organizational characteristics for innovation are not standardized by any standardizing body. However, inside Google, sub-components such as courses and training material, systems for performance evaluation and promotion, and heuristic rules for employees were standardized. One example is the regulation around the 20% time that all engineers have a right to use according to their own priorities – this is a way of standardizing and ensuring that time is available for creative work initiated bottom-up (cf. 3M, in Garud et al., 2011).

TQM and continuous innovation

As could be seen from this comparison, many of the “soft” ideas/core beliefs in the “broader” TQM concept (e.g. importance of a strong culture, employee empowerment, the primary role of visible leaders, total approach) are similar to the characteristics for innovation at Google. This fits well with the comment by Prajogo and Sohol (2001) that some of the practices of innovation management also are well recognized as TQM elements.²³ The main differences seem to be the overall management focus, e.g. on continuous improvement versus continuous innovation, and on artifacts such as the concrete design of organizational structure and management processes, for instance the performance review process for promotion. It seems also to be a difference in the way of thinking where the broader TQM concept stands for more of a (reactive) market pull mentality and Google emphasizing radical innovation stands for more of a (proactive) product push mentality (Prajogo & Sohal, 2001). The question is whether these differences are enough for drawing the conclusion that “...*TQM and the excellence approach require a fundamentally different managerial paradigm and mental model compared to earlier quality approaches*” (Dahlgaard-Park & Dahlgaard, 2008, p. 92). Alternative solutions to manage exploitation and exploration presented in research literature have been to interpret and translate the TQM principles differently for different environments²⁴ (Sitkin et al., 1994) or to form ambidextrous organizations (Benner & Tushman, 2002) or cross-functional product development teams (Sethi & Sethi, 2009). The solutions have therefore varied from changing the management paradigm to interpreting the principles in a context-relevant way to organizing for both exploration (innovation) and

²³ E.g. quality culture, learning organization, customer-driven organization, continuous improvement and a wide variety of so-called quality tools, such as QFD, Taguchi methods, SPC, FMEA, benchmarking (referring to a book by Zairi, 1999, of best practices in process innovation management).

²⁴For example “continuous improvement” could in a control-oriented firm be interpreted as “*Exploit existing skills and resources...Increase control and reliability*”, while in a learning-oriented firm it could be interpreted as “*Explore new skills and resources...Increase learning and resilience*”.

exploitation (continuous improvement) at the same time.

In order for a company to be both efficient and innovative, it needs to have a mental model that allows risk-taking and change, but also strives for control and cost efficiency. This “ambidextrous mental model” will in turn require a culture, an ambidextrous organization and management processes that foster both innovativeness and efficiency in a highly sophisticated way (Tushman & O’Reilly, 1997; Brown & Eisenhardt, 1998; Cole, 2002). TQM, if seen as a “school” striving primarily for control and efficiency (by limiting variation, standardizing and process-orienting the organization), might be of less value for companies in the future. Instead, there is a need to re-think and move towards a “school” in which control and chaos are balanced in a partly self-organized and semi-structured organization, in which only a few processes are formalized but where instead the use of heuristic rules and probe-and-learn processes are common. This in turn requires an even further trust in the employees, from trusting them as only problem-solvers to viewing them also as innovators and knowledgeable decision-makers. It demands a positive view of human beings and of their development potential. To create this balance might also demand a new set of leaders and training programs for leaders. Also the included TQM/business-excellence-based studies consider leadership as very important. Dahlgaard-Park and Dahlgaard (2008) emphasize the importance of building leadership by developing and/or recruiting leaders with the right values and competences; here is a similarity to Google’s approach.

As can be seen from the above discussion, the “broader” TQM concept does contain certain important elements that fit well with organizational characteristics for continuous innovation. However, the mental model on how to best manage and organize a firm is different, which indicates a need to change the “broader” TQM concept. If we apply these findings to a more

“narrow” TQM concept focused on measurement and statistical methods which by default has its primary value in limiting variation, in standardizing and process-orienting organizations, it is clear that this “narrow” TQM concept is quite far from the organizational requirements for innovation identified in the empirical study of Google.

Finally, some words about the brand ‘TQM’. Even if the TQM concept does change and would contribute to both efficiency and innovation, there is still a branding issue to be solved. TQM has in over 20 years been known and associated with quality and continuous improvement, or as was stated by Prajogo & Sohal, 2001), “...*even though TQM may encompass both a cost leadership and differentiation strategy, the emphasis is primarily directed towards cost leadership*”. To change this association of the brand will require a lot of branding work and a long time to do it.

Conclusions

The organizational characteristics for continuous innovation (OCCI) identified at Google were identified as important also by other researchers that have focused on continuous innovation in rapidly changing industries. In addition, these OCCI might be needed in most firms in the future as mature industries are expected to move towards more dynamic conditions, which in turn will create a more general pressure for continuous innovation.

The Google characteristics of a culture and leadership supporting self-organizing creative individuals interacting with others inside and outside company borders, supported by a semi-structured and ambidextrous organization and heuristic rules, only partly match the “broader” TQM concept (low match with the “narrow” TQM concept). If continuous innovation is to

become as important as continuous improvement for TQM companies, there is a need of providing and promoting an updated/changed version of the “broader” TQM concept. The update of the concept needs to be in the mental model, specifically of how best to organize and manage people for both incremental and radical innovations. However, there is also a brand issue. Even in the event that the “broader” TQM concept is updated, the brand ‘TQM’ is still associated with quality and continuous improvement. A re-branding strategy might therefore be necessary, which will in itself require efforts and time.

References

- Akao, Y., ed. (1990). *Quality Function Deployment*. Cambridge, MA: Productivity Press.
- Alänge, S., Lindström, J., Wedel P. (1987). Intryck och Tankar om Kvalitet - inspirerade av ett besök i Japan under oktober 1987. Dept. of Industrial Management, Chalmers University of Technology, Gothenburg (in Swedish)
- Alänge, S. (1992). Total Quality Management as a Tool for Organizational Change. *CIM Working Papers*, WP 1992-01.
- Alänge, S. (1994). The New Paradigm for Industrial Practices: Total Quality Management in 1994. *CIM Working Papers*, WP 1994-01.
- Antony, J. (2007). Six Sigma: a strategy for supporting innovation in pursuit of business excellence – invited paper. *Int. J. Technology Management*, 37(1-2), 8-12.
- Benner, M. (2009). Dynamic or Static Capabilities? Process Management Practices and Response to Technological Change. *Journal of Product Innovation Management*, 26, 473-486.
- Benner, M., Tushman, M. (2002). Process management and technological innovation: a longitudinal study of the photography and paint industries. *Administrative Science Quarterly*, 47, 676-706.
- Bessant, J., Caffyn, S. (1997). High-involvement innovation through continuous improvement. *Int. J. Technology Management*, 14(1), 7-28.
- Boer, H., Gertsen, F. (2003). From continuous improvement to continuous innovation: a (retro)(per)spective. *Int. J. Technology Management*, 26(8), 805-827.
- Brown, S. L., Eisenhardt, K.M. 1997. The Art of Continuous Change: Linking Complexity Theory and Time-paced Evolution in Relentlessly Shifting Organizations. *Administrative Science Quarterly*, 42, 1–34.
- Brown, S. L., Eisenhardt, K.M. 1998. *Competing on the Edge: Strategy as Structured Chaos*. Boston, MA: Harvard Business School Press.
- Chesbrough, H. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston, MA: Harvard Business School Press.

- Cole, R.E. (2002). From continuous improvement to continuous innovation. *Total Quality Management*, 13(8), 1051-1056.
- Cole, R.E., Matsumiya, T. (2008). When the pursuit of quality risks innovation. *The TQM Journal*, 20(2), 130-142.
- Dahlgaard, J.J., Park Dahlgaard, S.M. (1999). Integrating business excellence and innovation management: developing a culture for innovation, learning and creativity. *Total Quality Management*, 10 (4-5), 465-472.
- Dahlgaard-Park, S.M. (2011). The quality movement: where are you going? *Total Quality Management & Business Excellence*, 22(5), 493-516.
- Dahlgaard-Park, S.M., Dahlgaard, J.J. (2008). A Strategy for Building Sustainable Innovation Excellence: A Danish Study. *Corporate Sustainability as a Challenge for Comprehensive Management: Contributions to Management Science*, 2, 77-94.
- Dotchin, J.A., Oakland, J.S. (1992). Theories and concepts in total quality management. *Total Quality Management*, 3(2), 133-145.
- Dubois, A., Gadde, L.-E. (2002). Systematic combining: an abductive approach to case research. *Journal of Business Research*, 55(7), 553-560.
- Garud, R., Gehman, J., Kumaraswamy, A. (2011). Complexity arrangements for sustained innovation: Lessons from 3M corporation. *Organization Studies*, 32(6), 737-767.
- Irani, Z., Sharp, J.M. (1997). Integrating continuous improvement and innovation into a corporate culture: a case study. *Technovation*, 17(4), 199-206.
- Ishikawa, K. (1985). *What is Total Quality Control? The Japanese Way*. Englewood Cliffs, NJ: Prentice-Hall.
- JUSE (1987). Features of Company-Wide Quality Control in Japan. By Ikezawa, T., Kondo, Y., Harada, A., Yoneyama, T., *Proceedings from the International Conference on Quality Control (ICQC) in Tokyo 1987*, 43-47.
- Kanji, G.K. (1998). Measurement of Business Excellence. *Total Quality Management*, 9(7), 633-643.
- Kano, N., Seraku, N., Takahashi, F., Tsuji, S. (1984). Attractive quality and must-be quality (in Japanese). *Journal of the Japanese Society for Quality Control*, 14(2), 39-48. (To Western universities, the Kano Model was presented through the car industry.)
- Leonard-Barton, D. (1992). Core Capabilities and Core Rigidities: A Paradox in Managing New Product Development. *Strategic Management Journal*, 13, 111-125.
- Liker, J. K. (2004). *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer*. McGraw-Hill, New York.
- Lynn, G.S., Morone, J.G., Paulson, A.S. (1996). Marketing and Discontinuous Innovation: The Probe and Learn Process. *California Management Review*, 38(3), 8-37.
- March, James (1991). Exploration and Exploitation in Organizational Learning, *Organization Science*, 1(2), 71-87.
- Martensen, A., Dahlgaard, J. (1999). Integrating business excellence and innovation management: developing vision, blueprint and strategy for innovation in creative and learning organizations. *Total Quality Management*, 10(4-5), 627-635.

- Matias de Oliveira, J.C., Coelho Alves, D. (2011). Integrated total quality management: Beyond zero defects theory and towards innovation. *Total Quality Management & Business Excellence*, 22(8), 891-910.
- Matzler, K., Bailom, F., Anschober, M., Richardson, S. (2010). Sustaining corporate success: what drives the top performers? *Journal of Business Strategy*, 31(5), 4–13.
- MBNQA (1987-2012), *Malcolm Baldrige National Quality Award*, NIST (1987 was the first year that the quality award existed. The core values of MBNQA can be viewed as a definition of TQM)
http://www.nist.gov/baldrige/publications/upload/2011_2012_Business_Nonprofit_Criteria.pdf
- Prajogo, D.I., Sohal A.S. (2001). TQM and innovation: a literature review and research framework. *Technovation*, 21, 539-558.
- Sethi, R., Sethi, A. (2009). Can Quality-Oriented Firms Develop Innovative New Products? *Journal of Product Innovation Management*, 26, 206-221.
- Shiba, S., Graham, A., Walden, D. (1993). *A New American TQM; Four Practical Revolutions in Management*. Portland, OR: Productivity Press/The Center for Quality Management.
- Sitkin, S., Sutcliffe, K., Schroeder, R. (1994). Distinguishing control from learning in total quality management: a contingency perspective. *Academy of Management Review*, 19, 537-564.
- Steiber, A. (2012). *Organizational Innovations: A conceptualization of how they are created, diffused and sustained*. PhD-thesis, Dept. of Technology Management and Economics, Chalmers University of Technology, Gothenburg.
- Steiber, A., Alänge, S. (2012). A corporate system for continuous innovation. Submitted for publication in *European Journal of Innovation Management*.
- Teece, D. (2007). Explicating Dynamic Capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28, 1319–1350.
- Tushman, M., O'Reilly III, C. (1997). *Winning through Innovation: A Practical guide to Leading Organizational Change and Renewal*. Boston, MA: Harvard Business School Press.
- Tushman, Michael and others (2010). Organizational Designs and Innovation Streams. *Industrial and Corporate Change*, 19(5), 1331–1366.
- Zairi, M. (1999). *Best Practice: Process Innovation Management*. Oxford: Butterworth-Heinemann.