Quality and Innovation

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Abstract

Quality and innovation are recognized significant business issues in all kinds of organizations. However, quality professionals are not very much aware of the innovation phenomena, and neither innovation experts are familiar with the quality procedures. Nevertheless, there are a lot of cross-references between these disciplines. Relationship between quality and innovation is often vague in organizations. This paper considers questions of quality in innovation and innovation in quality, and realization of the both topics in organizations and society.

Evolution of the disciplines

Quality and innovation are distinct specialized disciplines with their own development history, expertise, specialists, research and education traditions, and methodologies. The modern professional approach of both areas dates back to early years of the 1900's (Tarde, 1903; Juran, 1995) (figure 1). We have recognized significant cross-references between these disciplines only very recently in some national and regional quality and innovation movements and in the international quality management standardization.

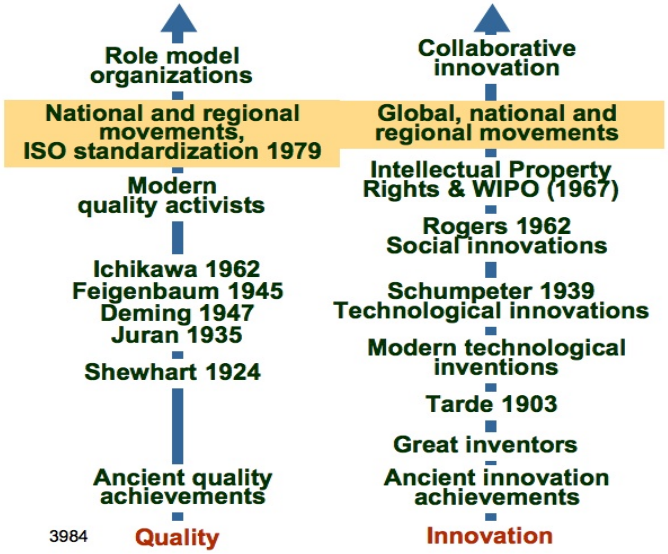

Figure 1. Evolution of the quality and innovation disciplines

Achievements and success of the both disciplines were based on the influence of strong and intentional experts and advanced organizations. More recently also the public actors

have contributed to their presence and development. A personal creativity of individual inventors has always played a prominent role in the field of innovation.

Quality and innovation come true only in real organizational implementations. In order to recognize useful relationships between them for their integrated implementation in organizations we should at first be aware of their inherent concepts, principles, and foundations.

Successful quality management through innovations

Quality of something means the degree to fulfill needs and expectations of those parties being interested in it (ISO, 2005). Organizations compete with the quality of their products (goods and services). In order to be successful, organizations must be responsive to changing market situations and strive for distinctively outstanding and excellent products through their efficient business processes. This is the aim of quality management, and one of its major activity areas is continual performance improvement of business processes and products (ISO, 2009). That is based on innovation. Quality improvement tools are factually creativity tools (Harrington et al., 1998). Hence, innovation is not any new subject in the quality discipline, but it has inherently been in professional quality practices already decades. In fact, there is no real improvement without innovation.

The word innovation explicitly appeared on the quality discussions sometimes about ten years ago. From then on, this concept has also got an increasing importance in national quality initiatives, especially represented by the performance excellence models (quality award criteria) (NIST, 2010), the future of quality studies (ASQ, 2011), and in the international quality management standardization, especially in the ISO 9004 standard (ISO, 2009). Innovation can be applied for performance improvements at all business areas in organizations including technology, products, processes, and the business system as a whole.

Innovations to improved quality

Innovation exists everywhere, including the world of products and technology and also the world of words; innovation is discussed in the scientific and technical literature, but also in social science like history, sociology, management and economics. Innovation is also a central idea in the popular imaginary, in the media and in public policy. Innovation has become the emblem of the modern society, and a panacea for resolving many problems.

Vocabulary of words and terms used in the context of innovation has fluctuated during the decades (Dance, 2012). While innovation experts and many organizations acknowledge that innovation is important to the business growth and success, the term "innovation" is still without a consistent, agreed-to definition in the business world. Sometimes we may get confused about the terms invention, creativity, and innovativeness.

Most commonly innovation is a conceptually new and commercially viable solution in products, processes, business systems, and technologies, or a new solution that is available to markets, governments, and society (figure 2). In simple words, innovation

means improved quality. All business innovations directly aim at improving product performance, increasing the effectiveness and efficiency of business processes, and making possible organizations' radical structural and operational reforms. All these topics are basic intentions of the professional quality management.

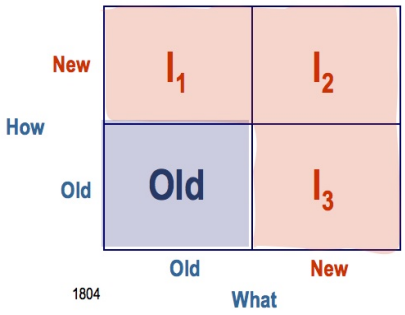

Figure 2. Innovations (from I_1 to I_3) are for improving the performance of products, and business structures and processes consisting of "What" and "How" aspects. From organization's performance point of view How is more important than What.

Innovations in technology and quality management

Technology is a broad concept (Christensen, 1997) in the context of innovations and it covers processes by which an organization transforms labor, capital, and information into products to provide value to the customers and other stakeholders. This technology concept extends beyond engineering and manufacturing to encompass a range of marketing, investment, and managerial processes. It also includes quality management. There are two major directions in technology development (Christensen, 1997):

a) Sustaining technology for fostering and enhancing technical features
b) Disruptive technology for simplifying existing technical solutions and providing very different value proposition.

Technology-based innovations of products (goods and services) provide practically unlimited possibilities for enhancing quality of products. This includes innovations in information technology (IT), biotechnology, nanotechnology, energy technology, social technology, etc. (Anttila&Jussila, 2013)

Especially opportunities of the new IT solutions create new ways to work in processes and carry out business, e.g. through networks or ecosystems of organizations, which is challenging also from the quality management point of view.

Very new and improved product characteristics may be achieved by using technologies like radio frequency identification (RFID), social software and Web 2.0 and in particular internet of things (IoT), mobile payment technology, ubiquitous IT, etc. Cloud services and mashup products are currently important practical examples. IoT is also known as machine-to-machine (M2M) services, which means that not only a service provider is represented by an automatic means but also the recipient may be a machine. The IoT emphasize sensors that can connect objects to the internet and automatically send their data to IT systems. The objects can be everything from health care monitors to traffic lights, thermostats, or trains.

We have recognized serious needs for innovations in quality practices and methodologies (Anttila, 2011), and especially with regard to disruptive and "lean"

solutions in quality management and quality assurance, because the existing prevalent practices have become too formal, complicated, or rigid in many implementations, and they are not necessarily any more relevant or effective to the challenges of today's business environments, e.g. related to complexity of the networked businesses and ecosystems (figure 3).

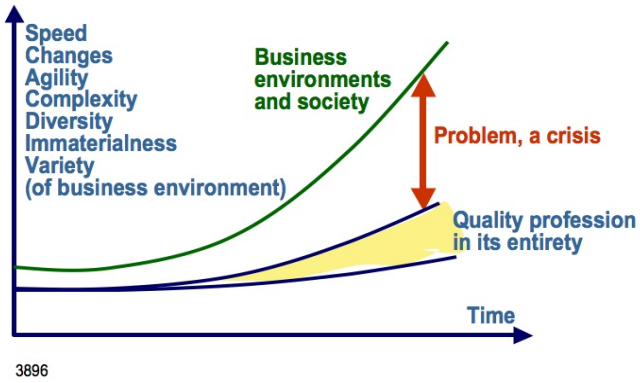

Figure 3. A crisis in quality management or quality profession in its entirety due to the lack of innovations in the quality management principles, tools, and infrastructures with regard to the changes in organizations' business environments. Are there any real innovations created for organizations' quality implementations after Deming, Ichikawa, Juran, and Feigenbaum? Do we only follow the French saying, "Plus ca change, plus c'est la même chose (More it changes, the more it's the same thing)"? In this way the quality profession is not able to adapt to the general development of organizations' business development and trends of the society at large.

The creative use of quality management standards for business benefits

The international standards have a big impact on quality implementations in organizations. There are no limitations to use innovations also in the traditional areas of quality management, e.g. in using and implementing ISO 9000 standards in a creative way and to strive for excellence in business performance (Anttila, 2013). It depends only on organizations' business leaders' and experts' will and ability to differentiate from the others of the crowd. A key issue is that standards are understood as unlimited opportunities and not as specific targets ("The trampoline approach", figure 4).

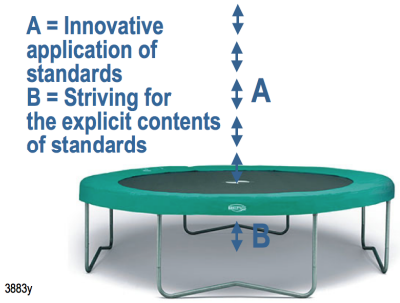

Figure 4. The "trampoline approach" for creative applying the standards

The biggest obstacles, which hinder or prevent our creative progress, are the existing habits, misperceptions, and prejudgments of ourselves, and cultural aspects of our organization, business branch, or country, from which it is difficult to break away. However, innovative possibilities may be found from the following cornerstone areas for a business integration of the organizational quality practices for an excellent performance and sustained success (figure 5) (Senge et al., 1995):

- Sound guiding business ideas including organization-dedicated concepts and principles, goals and strategies, and their articulation aligned with the challenging aims of the ISO 9000, and particularly ISO 9004:
  - Living with the models of the modern professional quality approach integrated with business issues
  - Understanding ISO 9000 standards for quality of management and for business excellence
- Effective tools, methods and theories supporting the quality approach:
  - Using internationally recognized methodology for increasing business effectiveness and efficiency, and for differentiating from the others
  - Applying modern means, e.g. using advanced IT business methodology (”e-quality”, e-certificate”, etc.)
- Innovatory management infrastructure for realizing the quality approach
  - Mobilizing the whole organization to use innovatively company’s selected business integrated quality principles and tools
  - Tuning quality approach with the rapidly changing and emergent business environment and organizational management structures

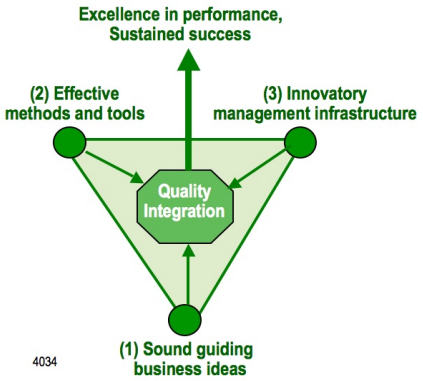

Figure 5. Cornerstones for a creative business integration of quality management, “Quality Integration”. In the same way we also can consider the innovation integration.

“Cross-fertilizing” of quality and innovation

Organization-wide, national, and regional initiatives have been launched to promote innovation activities broadly (Barroso, 2009; Council on competitiveness, 2005; Miettinen, 2002; Uhlin, 2005). Typically in these contexts, also quality aspects have been presented, but only in general terms. Innovation experts have not necessarily been in close contacts with quality experts. In these broad-based views, innovation activity is typically seen as a system issue, although in practice innovations are created by creative

individuals and often in networks. Today also quality is originated from the activity of networks of individuals and organizations.

Organizations have a key role in implementing quality and innovation procedures in practice for business benefits. It is not beneficial to the organizations if quality management and innovation management are developed separately as isolated initiatives from each other. The both disciplines need each other and they even may "cross-fertilize" each other, e.g. there should be quality and innovation in both quality and innovation processes.

From-invention-to-innovation process is in practice very complicated and is involved with many different actors (figure 6). Professional quality practices may be beneficial in this process.

Figure 6. From invention to innovation in practice

This kind of complicated environment is particularly challenging for many small and medium size enterprises (SMI) and start-ups whose business is often totally based on innovative solutions (Ries, 2011).

People as the primary source of innovation, creating intellectual property

Creativity is connected with the human subconscious and intuition (imaging). Every human being is naturally creative. A key issue is to release this ability of the internal and external obstacles to implementation, and to activate it to practical situations (processes). This is a big challenge of the organizational innovation management.

Artists are excellent examples of creative individuals, and their working could provide benchmarking insight also for the management of business innovations. They may demonstrate how the path to higher creativity is affected by the following factors (Cameron, 1992):

1. The sense of safety; positive attitude to creativity without fear
2. The sense of identity; honest self-scrutiny and awareness with regard to own needs, interests and mental limits, autonomy and self-protection
3. The sense of power; mental strength, and perseverance to overcome obstacles of spiritual growth, hope

4. The sense of integrity; being honest and having strong moral principles, moral uprightness, being whole and undivided
5. The sense of possibility; release from everyday ties, believe in a new and positive action
6. The sense of abundance; joy and plentifulness of the good things of life
7. The sense of connection; social and professional contacts for influence and help
8. The sense of strength; winning the losses and withstanding criticism, coping with the inadequacy of time
9. The sense of compassion; sympathetic concern about the sufferings or misfortunes of others
10. The sense of self-protection; avoiding obsessions, e.g. workaholism, dangers due to lack of mental stimulation, lust of reputation, and unhealthy competing
11. The sense of autonomy; feeling freedom, acceptance and success, detaching from self-centeredness, getting contact with the outside world through physical activity
12. The sense of faith; trusting, knowing own consciousness and creativity, recognizing imagination

However, often the inventors are going to be quite alone, without the necessary support from others.

Intellectual property (IP) derives from the work of an individual's mind or intellect (WIPO, 2013; WTO, 2013). IP includes industrial property (inventions, patents, trademarks, industrial designs, and geographic indications of source) and copyright (novels, poems and plays, films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs). Intellectual property rights usually give the creator an exclusive right over the use of his/her creation for a certain period of time. Many legal principles governing intellectual property rights have evolved over centuries. Creative Commons (Creative Commons, 2013) provides an infrastructure and tools to give individual creators, companies, and institutions a simple, standardized way to a “some rights reserved” approach to copyright though licenses that are legally solid, globally applicable, and responsive to our users’ needs.

Today, many of the innovations come from the collaboration of many individuals operating in networks (Tapscott&Williams, 2006). Genuine innovatory networks are unplanned, emergent aggregations (Anttila, 2010). Their growth is sporadic and self-organizing. Network members are independent actors. Nobody manages the network as a whole but each actor has its own characteristic impact in the network. Crowdsourcing is the practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people and especially from the online community rather than from traditional employees or suppliers.

Business integration and organizational learning

As well as the evolution of the quality and innovation disciplines (figure 1), also the business management has a similar historical evolutionary development. Many business thinkers and teachers from the creators of the classical school of management theory, e.g. F.W Taylor and H. Fayol, to today’s influential persons have defined their own management principles and preferences according their own experiences and insights

(Anttila, J., et al. 2012a). These are significant general references for managerial development in any organization.

Early thinkers emphasized the importance of compliance and control aspects. Although much later quality and innovation appeared as concepts in the reference materials of the business experts they were typically used – however with some exceptions – in quite a general sense and without linkages to the actual quality and innovation references.

Quality and innovation are abstractions, they are related to the characteristics of the results or outputs of certain activities or processes; managing quality or innovation is not possible directly but management takes place through organizations' business system and processes (Anttila&Jussila, 2011). According to the ISO 9000 standard quality management means coordinated activities to direct and control an organization with regard to quality (ISO, 2005). Quite respectively innovation management means coordinated activities to direct and control an organization with regard to innovation.

Business leaders at different levels of organizations keep a central position to consider the managerial disciplines on top of their general management responsibilities (Anttila et al., 2012b). Business leaders often prioritize financial performance and legal aspects according to neoliberalistic tradition where the central pillars are the market and the individual interests, and hence it is challenging for highly specialized other disciplines to get a remarkable role in their agendas. Business leaders normally in practice recognize importance of quality and innovation but they do not consistently act for them according to their management duties. Naturally top business leaders call for creativity, reasoning, and intuition, no less than rational fact-based analysis, because they has to wrestle with dilemmas and not only struggle with problems (Low, 1993). With dilemmas, unlike problems, there are no right solution; one can only choose the most suitable solution. Organizational quality management and innovation management cannot be delegated and cannot be genuinely and effectively implemented without business leaders' consistent contributions based on their organizational position, authority, and role.

In order to ensure effectiveness, challenging management domains, including quality, innovation, and many other specialized disciplines, should be integrated with the organization's business system and processes (Anttila et al., 2012a), and be consistent with the organization's business culture. Successful development of the business integration is a holistic learning process that leads on to continual refining discipline related concepts and principles, tools and methodologies, and management practices (figure 4) in a compatible and balanced way. This organizational learning constitutes the development not just of new capacities, but of fundamental shifts of mind, individually and collectively. That is based on sensibility to new opportunities, changing attitudes, and getting new skills. In this context, the five basic learning factors of figure 7 are the key means by which this learning is ensured and business integration takes place (Senge et al., 1995):

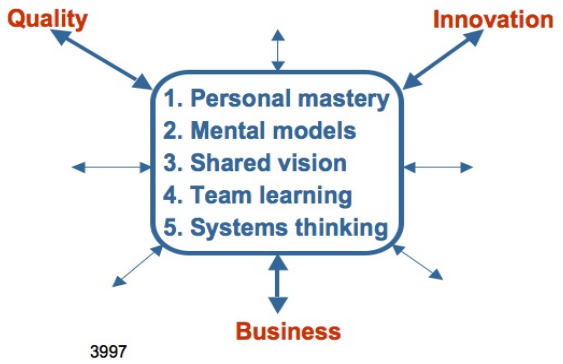

Figure 7. Five basic learning factors to ensure organizational learning towards business integration of quality, innovation, and other specialized business disciplines

ISO/IEC Directives have defined a high level structure and identical core text, and common terms and core definitions to be used in all standards of the different discipline specific management. The high level structure consists of key issues of the business management that are significant for promoting the business integration of specific management issues. These guidelines can be used in integrating quality management and innovation management processes simultaneously into an organization's processes of business management.

Conclusions

Reflecting on the development of the quality and innovation activities in general one can draw a conclusion that they continue to evolve largely as separate disciplines, and their relationship is not generally clear. However, the interaction between them is important and fruitful in organizations and among respective experts communities. Both disciplines should be effectively integrated with the business system and processes. In this text, the relationships between quality management and innovation have been considered. Very analogical is the situation also between innovation and many other disciplines e.g. environmental management, information security management, occupational health and safety management, etc.

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