Competence Management – A Multidisciplinary Study of its Evolution

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Abstract: In the scientific literature, competence management seems to appear as a new independent "field of research". A detailed analysis of the scientific contribution of competence management shows essentially that the management of competence gains more and more importance in different scientific domains. This paper gives a short overview of different concepts of competence management regarding the big variety of points of view and interpretations. In a further step it shows its evolution over the last decade since 1998 in regard of different scientific fields that are dealing with it. In a final step perspectives that focus on information technology are given.

Keywords: competence management, concepts, evolution

1. Introduction

From a globalisation point of view where increasing innovation is the main principle of competitiveness for many industrial countries, the efficient management of human capital becomes a strategic objective.

Globalisation leads to stronger collaborations on the international market what means that striving for worldwide competitiveness requires flexibility in organisational processes as well as management and control of knowledge, skills and critical competencies. Working power has to be available just when it is needed to rapidly complete required tasks by having a fast access to all necessary resources. The human resource of competencies can no longer be only treated as a resource among the others. It is the management of organisations'competencies that has turned out to be an essential factor to capture a strategic market position in the international market. A real change in industrial management methods and tools appears obligatory in that perspective.

Organisations can no longer be considered only as production systems of products and services. They have also to be understood as production systems of competencies. This understanding has evoked a demand to identify the competencies needed to work effectively. Competencies are seen as the basis of competitiveness and innovation. Indeed, this new way of considering competencies as human resource, regards competencies not only as a resource among others but as the main source of innovation and competitiveness. Competence management is extremely important for the achievement of organisational goals and enables to offer innovative products and services of value to customers.

From these trends result new scientific challenges. Competence management, comprising the management of knowledge about competence, is dealing with several concepts in various domains. A detailed analysis of the scientific production relative to competence management will show essentially that the management of competencies became a preoccupation in a big part of sciences. The variety of points of view and

interpretations of competence management call up to a lot of caution as for any other scientific discipline and invites to understand the senses which are given to them.

2. Objectives

This paper aims to present a consolidated set of results from a general study of research work in the area of competence management and analyses its evolution over the last ten years. Competence management is known as a topic dealing with several concepts in various domains. However, studies about the development over time and progress within concrete domains are missing. This analysis is motivated by the need to provide an overall picture of areas dealing with competence management to present the current situation.

Clear is, that knowledge intensive fields are more and more concerned by the management of knowledge, skills and competencies. The growing importance of information technology at the same time founds its reason in the fact that IT-systems provide the infrastructure that is necessary to support the management. Technology is an important resource and capability that can be used in building competencies of high importance for organisations. This might also be through domestic and international inter-firm collaboration and technology alliances that help an organisation to develop new competencies faster than through internal development.

Without claiming to give a consensual definition of competence management, the reader will be guided through the different concepts and through different scientific domains during the time to get a holistic picture of competence management that permits us to make former recommendations in the field of IT.

3. Method

The paper is organized as follows. First, we define the term of competencies. Our analysis is then devoted to the identification of the scientific fields dealing with competence management from the content point of view. We used a relatively simple methodological heuristic to identify research papers with a focus of capabilities for competence management and to meta-analyse appropriate studies that is described in detail. Library databases were utilized using a 'keyword' search. The search was directed at literature on "competencies" and "competence management". The books and articles that were identified through this search were then read with two objects in mind: to identify other relevant literature that would then be read and to establish the concepts of competencies and competence management described in the material.

In a next step the empirical results follow and finally suggested implications for research and practice are included.

4. Concepts of Competencies

The term "competence" is taking up an important position within the very differing scientific fields of social, organisational or engineering research. Nevertheless, these disciplines use the term competence in various manners and produce at the same time various field-related understandings of it. Many different concepts have been suggested of competencies. Often are used content-wise interchangeably with other terms as capabilities, abilities, routines or skills. Although the term competence can be found frequently in modern management literature, there is little consensus on its meaning. In order to ensure conceptual depth, this paragraph will investigate different approaches to derive a more comprehensive picture.

Competence management is often used in the same context as knowledge management and many of the papers that were analysed in this study try to make the link between competence-oriented and knowledge-oriented concepts. Competence management thus

requires various methods and instruments for the qualitative and quantitative registration of competencies and can take advantage from the knowledge management techniques to support the mentioned process categories and to implement a holistic system of competence management. A clearer picture of the relation of knowledge and competence gives figure 1 according to North (North, 2002).
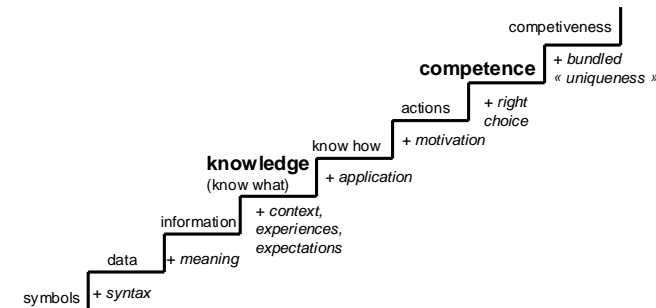

Figure 1: Stages of Maturity on the Competence Ladder (North, 2002)

North considers that knowledge gains only of value for an organisation if the ''know what'' will be transformed in "know-how". Knowledge is only measurable in form of actions. In the moment of knowledge application substantiate competencies. Competencies in the field of knowledge management seem therefore according to North to be more an event, rather than an asset (North, 2002). This means that competencies do only exist when the knowledge meets a task. Also Teece et al. distinguishes that knowledge builds the basis for competencies and that competencies are composed of knowledge, which occurs from learning that takes place within the organisation (Teece et al., 1997).

Teece distinguishes further that competencies are characterised by sets of knowledge, know-how and behaviour associated to a context and linked to individual actors. The expression ''individual competence'' is used to deal with the competence of a person, the expression ''collective competence'' deals with the competence emerging from a group of persons. Finally the expression ''global competence'' is used to describe the organisational ability of an organisation, also so-called core competencies (Teece et al., 1997).
Dreyer has defined competencies as a system of human beings, using technology in an organised way and under the influence of a culture to create an output that yields a competitive advantage for organisations (Drejer, 1996).

The research of Coates and McDermott also shows the importance of including technology management within the field of product competence when examining competitive priorities (Coates and McDermott, 2002). In the resource based perspective competence represents not only a combination of knowledge and skills that are difficult for competitors to duplicate but according to Coates and McDermott also of technologies which provide learning opportunities to increase their competencies (Coates and McDermott, 2002).

Also Prahalad and Hamel and Kogut and Zander support this view and estimate that (Prahalad and Hamel, 1990/ Kogut and Zander, 1992). As Prahalad and Hamel stated competence is defined as learning process of an organisation of how to coordinate diverse production skills and how to integrate technologies. Research in the area of accepting technology in an individual's work life assists us in understanding that discomfort with technology in general has a negative impact upon core competences (Walczuch et al. 2007).

Prahalad and Hamel estimate that capabilities of employees, combined with each other in teams and connected through structures and routines, form the building blocks of competencies. According to this competence includes the organisation of work, the involvement of employees, the commitment to work and communicate across boundaries and the delivery of value to customers and other stakeholders (Prahalad and Hamel, 1990).

As stated by Winter competencies are defined as a collection of routines, which refer to a behavior that is learned, highly complex, repetitious and founded in tacit knowledge. Such so-called routines confer upon an organisation's management a set of decision options for producing significant outputs of a particular type (Winter, 2003). Further Winter differs three levels of competencies: ad hoc, operational and dynamic.

Ad hoc competencies can be defined as an organisation's spontaneous reaction to sudden changes in the environment or other unpredicted events. Both, operational and dynamic competencies may benefit from ad hoc competencies as they disrespect routines under certain circumstances in order to increase flexibility. Depending on the nature of the time-frame (short term vs. long term), the organisation either falls back to its operational competencies or uses the ad hoc experience as input into its dynamic competencies to develop new operational competencies.

There are some authors who make a difference between three areas of competencies: product, process and market (Coates and McDermott, 2002/ Ford and Saren, 2001/ Leonard-Barton, 1992/ Winter, 2003). Those are defined as it follows:

- Product competence: Routines related to the properties and characteristics of the value created by the firm for customers;
- Process competence: Routines related to the properties and characteristics of the value-creation process of the firm;
- Market competence: Routines related to the properties and characteristics of the value transfer between the firm and its environment.

Ritter and Gemünden use the term competence for organisations and explicitly their management of network relations (Gemünden and Ritter, 1997). To differentiate dimensions of competence, Ritter support the perspective of psychology and behavioural sciences, which implies that organisational competence is determined by the formal qualification of employees and extent of task fulfilment in the organisation (Ritter, 1999).

Many authors look at competence as an organisational phenomenon and direct their broad attention on core competencies in the context of organisational behaviour, strategic management and marketing (Prahalad and Hamel, 1990/ Teece, 1997/ Wang et al., 2004). Those authors opine that competencies have strategic potential and should enable organisations to diversify into new markets. From their point of view competencies are referred as core competencies if they are regarded as critical for the achievement of competitive advantage. Core competencies have been built over time and are not easily imitated. Prahalad and Hamel emphasise that the concept of core competencies includes group and individual competencies as well and regards not only resources themselves but also how they are combined, connected and used (Prahalad and Hamel, 1990). Here is where competence management is getting more and more important.

5. Understanding of Competence Management

More and more, the strategic management field is focusing on the role of competencies and resources that accumulate within an organisation (Leiponen, 2000/ Heene and Sanchez, 1997/ Harzallah and Vernadat, 1999).

According to Berio and Harzallah there are four different processes of competence management: competence identification, competence assessment, competence acquisition, and competence usage (Berio and Harzallah, 2007), which are described as follows:

- Competence identification: when and how to identify and to define competencies required and implement strategies.
- Competence assessment: when and how to identify and to define competence acquired by individuals, when and how an organisation can decide that an employee has acquired specific competencies.

- Competence acquisition: how an organisation plans and decides about how and when to acquire competencies
- Competence usage: how to use the knowledge about the competencies produced and transformed by identification, assessment and acquisition processes, how to identify gaps between required and acquired competencies, how to find key players etc.

Competence management is defined as focussing on acquired and required competencies to reach organisational goals. Often only individual competencies are taken into account, but to reach organisational goals a broad approach must to be followed and also the competencies on the group level and finally also on the organisational level, the core competencies, have to be taken into account.

6. Evolution of Contributions in the Field of Competence Management

The first step of this study was dedicated to the identification of the scientific fields dealing with competence management. A relatively simple methodological heuristic was used to identify research papers with a focus of competence management. Library databases that provided in international journals were searched using a "keyword" search.

Due to a broad review process of 815 publications during the last decade since 1998 we defined seven domains which are seen in figure 1 with their distribution. The evolution of the publications of several areas was considered in a further step.
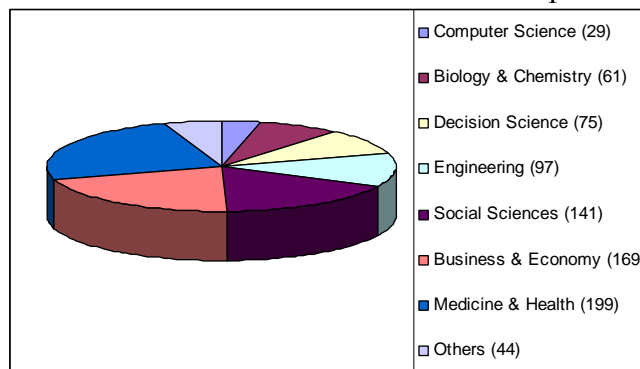

Figure 2: Scientific Domains Dealing with Competence Management

Among the different scientific domains following five were chosen for further analysis: Computer Science, Decision Science, Engineering, Social Sciences, Business and Economy. We excluded the domain of Medicine and Health as well as the domain of Biology and Chemistry as there are too far away from our research field.

The chosen domains were addressed during the last decade since 1998 until 2007. The number of contribution of the year 1998 includes also the publications of earlier years.

6.1 Computer Science

Contributions in the domain of Computer Science were still modest, to our best knowledge there have not even been any publication between 2001 and 2003. Nevertheless there is a high increase in 2007 recognised which shows the exploding importance of competence management in this field depending of the fact that competence management often means the introduction of new IT-systems.

6.2 Decision Science

It is interesting to notice that during the last decade no major publication has been identified. This has significantly changed in 2007, where the number of contributions multiplies about four times what highlights the raising importance also in this scientific field. It would be interesting to analyse the following years.
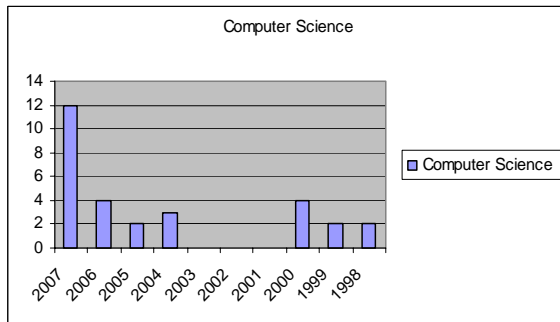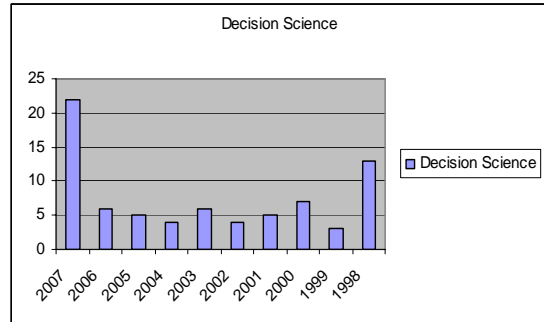

Figure 3: Evolution in Computer Science

Figure 4: Evolution in Decision Science

6.3 Engineering

The Engineering applications and studies addressed the competence management field since the beginning what highlights that it is now on the way to be optimized. We observe a faint continuous linear progression of the contributions which seems to explode in 2007.

6.4 Social Sciences

Social Sciences address the competence management related issues since the beginning with a number of high contributions. The number of contributions is very constant and high. It is easy to extrapolate this evolution and a continuation of this behaviour is probably expectable. If the evolution is considered in details, it can be noticed that after a rich period follows a period with fewer contributions. This might mean that regular research activities are conducted after each period of publication leading to significant results.
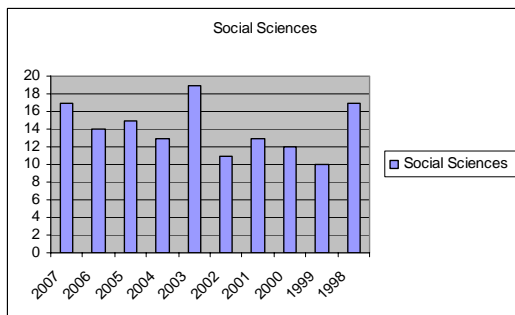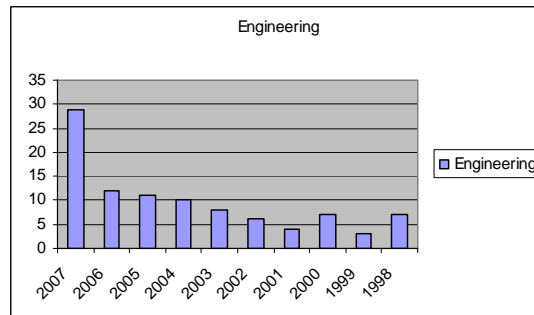

Figure 5: Evolution in Social Sciences

Figure 6: Evolution in Engineering

6.5 Business and Economy

Business and Economy as a fundamental discipline is the scientific domain where one can see that competence management is a real research field receiving a high significant quantity of contributions. It is also remarkable that the continuous evolution shows the potential one can have to collaborate with researchers in business or economy when coming from another field.
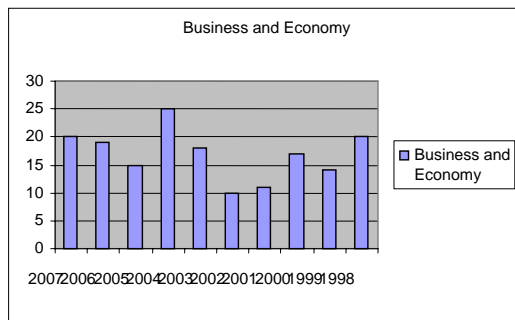
Figure 7: Evolution in Business and Economy

7.   Conclusions

The reality of competence management in organisations joins in a multiplicity of ends and situations. In the scientific literature competence management seems to appear as a sort of a more or less unified and generative "field of research" that gains nowadays more and more importance even in domains like "Decision Science" where it has according to our analyse never had a significant role before. Main approaches for competence management can be found in scientific domains like Social Sciences and Business and Economy where Competence Management has always had a significant quantity of contributions.

The analysis has shown that the raising importance has nearly exploded in 1997 which emphasise the actuality of this topic.

Even if the described concepts of competence management are based on different theoretical backgrounds one common characteristic is the ability to achieve organisational goals to strive for worldwide competitiveness and to offer innovative products and services of a high quality. In practice, competence management often means the introduction of new IT- systems but it seems to be difficult to clarify the right technology to combining the different scientific approaches of the different sciences. At the same time the number of technology is increasing and they are becoming more and more complex. Only the right technology could create significant advantages for an organisation regarding its competences.

8.   Perspectives

Integrating the core competence concept in technology selection decisions helps an organisation to build competencies around its strategic resources. Kogut and Zander point out that the right technology is an essential resource needed in the core competence concept (Kogut and Zander, 1992). The right technology can offer a very effective leverage on the process of building competencies but it has to be adapted to the different scientific domains and their concepts. The choice of technology depends on the understanding of the concepts of competence management. Future work will be about the identification of common concepts and the in which kind they should be integrated in IT-systems.

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