



Measuring and benchmarking intellectual capital

Intellectual
capital

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Abstract *The importance of intellectual capital (IC), as a prime value driver in today's knowledge-based economy, is undisputed. Benchmarking is seen as a tool for identifying, understanding, and adopting best practices in order to increase operational performance. The paper explores techniques of benchmarking the operational management of IC. The research is based on a longitudinal action and case research in an R&D organization. The failure to benchmark IC management practices between two seemingly identical subsidiaries has implications for the measurement and benchmarking of IC. The research concludes that it is critical to understand the context, organizational epistemology and value-creation pathways before organizations start any attempt to compare or benchmark IC.*

Introduction

Today, intellectual capital (IC) is widely recognized as the critical source of true and sustainable competitive advantage (Marr *et al.*, 2002). Carlucci *et al.* (2004) demonstrate that the management of IC impacts business performance. Knowledge is the basis of IC and is therefore at the heart of organizational capabilities. The need to continuously generate and grow this knowledge base has never been greater.

Benchmarking is a widely used tool in many traditional areas of performance and is expected to be beneficial in transferring best practices in managing IC. It is seen a managerial technique to identify performance gaps and improve operational performance (Yasin, 2002).

An extensive review of the benchmarking literature resulting in more than 5,000 hits (Yasin, 2002) identified not one single article on benchmarking IC. Other data suggest that only 12 percent of senior executives are satisfied with their internal knowledge sharing (Ruggles, 1998) and that companies have more problems than anticipated when transferring capabilities (Galbraith, 1990).

The aim of this paper is to explore IC benchmarking. The focus of the research is on operational benchmarking of IC using a case study of a leading R&D organization. The case study demonstrates a failed attempt to benchmark IC management processes. The paper will explore the reasons why this attempt failed and draw up implications for measuring and benchmarking IC. In order to make benchmarking applicable to IC processes, the findings call for changes in the way benchmarking is performed.

The paper starts by defining the concept of IC in organizations and establishing the link between IC and business performance. The paper then discusses how knowledge management processes connect IC and performance, before explaining how the corporate context and epistemology impact the effectiveness of IC management. The paper then briefly outlines IC measurement and defines benchmarking in the context of this research. Subsequently the research approach and the findings of the study are



outlined before the author finally discusses the findings and draws three distinct conclusions from this research.

IC in organizations

At this stage it is important to clarify what is meant by IC and what the link is between IC and organizational performance. The author takes a resource-based-view of the firm and considers organizational knowledge at the heart of organizational capabilities. This view of competence-based competition and the notion of increasing returns was first framed by Edith Penrose (1959) and then later enhanced by Birger Wernerfelt (1984) and Richard P. Rumelt (1984) who are seen as developers of the modern resource based view of the firm (Foss, 1997). Firms are seen as heterogeneous entities characterized by their unique resource base (Nelson and Winter, 1982; Barney, 1991) and this resource base consists increasingly of knowledge-based assets (Stewart, 1997; Roos *et al.*, 1997; Lev, 2001; Sveiby, 1997, 2001; Marr *et al.*, 2002). IC is of strategic importance as one of the primary sources of the firm's profitability (Grant, 1991). Following this initial work, the strategy and economics field adopted the concept of intellectual assets and formulated the concept of the knowledge-based organization (Winter, 1987; Nonaka, 1991; Teece, 1998; Teece, 2000; Spender and Grant, 1996).

In accordance with Marr and Schiuma (2001), IC is defined as the group of knowledge assets that are attributed to an organization and most significantly contribute to an improved competitive position of this organization by adding value to the defined key stakeholders.

Also, based on the earlier work of Marr and Schiuma (2001), IC can be classified into the following six categories:

- (1) *Stakeholder relationships* include all forms of relationships a company has with its stakeholders. These relationships might include licensing agreements, partnering agreements, contracts, and distribution arrangements. They also include relationship with customers such as customer loyalty and brand image, as a fundamental link between the company and one of its key stakeholders.
- (2) *Human resource* embraces knowledge assets provided by employees in forms of skills, competence, commitment, motivation and loyalty as well as in form of advice or tips. Some of the key components are know-how, technical expertise, and problem solving capability, creativity, education, and attitude.
- (3) *Physical infrastructure* incorporates all infrastructure assets, such as structural layout of buildings as well as information and communication technology like databases, servers, and physical networks like Intranets.
- (4) *Culture* embraces categories such as corporate culture, organizational values, networking behavior of employees and management philosophies. Culture is of fundamental importance for organizational effectiveness and efficiency since it provides people with a shared framework to interpret events.
- (5) *Practices and routines* include formal or informal internal practices such as process manuals providing codified procedures and rules, virtual networks, tacit rules and informal procedures, tacit rules of behavior as well as management style.

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- (6) *Intellectual property* is the sum of knowledge assets such as patents, copyrights, trademarks, brands, registered design, trade secrets and processes whose ownership is granted to the company by law.

Carlucci *et al.* (2004) show how the management of IC impacts business performance. Improvements in business performance are seen as an increase in value generated for the key stakeholders of an organization. The generated value is the result of an organization's ability to manage its business processes and in turn the effectiveness and efficiency of performing organizational processes are based on organizational competencies. Finally, the management of its IC enables an organization to grow and develop organizational competencies. Therefore, the fact that organizational competencies are based on IC allows us to state that their improvement takes place through the management of IC or knowledge management (KM), which is at the heart of business performance improvement and value creation.

KM consists of processes that facilitate the application and development of IC, in order to create value and to increase and sustain competitive advantage. Marr *et al.* (2003a, b, c) identify the following seven processes of knowledge management:

- (1) knowledge generation;
- (2) knowledge codification
- (3) knowledge application;
- (4) knowledge storing;
- (5) knowledge mapping;
- (6) knowledge sharing; and
- (7) knowledge transfer.

These processes can then be used to manage and grow the IC of an organization.

Effectiveness of IC management

The effectiveness of knowledge management processes to grow and maintain IC depends on their match with the organizational requirements. One of the key criteria for effective knowledge management processes seems to be the match with the organizational epistemology (Marr *et al.*, 2003a, b, c). Georg von Krogh *et al.* (1994) introduce the concept of corporate epistemology as the theory on how and why organizations know and how they believe knowledge is developed. Nonaka *et al.* (2000) conclude that despite the widely recognized importance of IC as a vital source of competitive advantage, there is little understanding of how organizations actually create IC by dynamically managing knowledge. According to Nonaka and Konno (1998) knowledge creation requires a shared context, which they label "*ba*". *Ba* is described as a shared space, which can be physical, virtual, or mental. Knowledge creation, in contrast to information, cannot be separated from its context and is embedded in *ba*. This implies, that the KM practices in organizations have to match the knowledge creation requirements of individuals or group of individuals who are involved in the knowledge creation. If organizations fail to match the practices with the requirements, then knowledge management systems might be ignored and knowledge created outside the organizational KM system (Marr *et al.*, 2003a, b, c).

Therefore, in order to ensure the effective management of IC it is central to understand the epistemological belief systems of organizations and how it compares with the knowledge management processes in place. To shed more light onto the issue of corporate epistemology, the following describes three different theories of knowledge and knowledge creation, based on Venzin *et al.* (1998) and adopted by Marr *et al.* (2003a, b, c):

- (1) *Cognitivists*. Cognitivists consider the identification, collection and central dissemination of information as the main knowledge development activity. Organizations are considered as open organizations that develop increasingly accurate pictures of their pre-defined worlds through the assimilation of new information. Knowledge is developed according to universal rules, hence the context of the incoming information is important.
- (2) *Connectionists*. There are many similarities here to the cognitivist viewpoint but a difference being that there are no universal rules. Rules are team-based and vary locally, therefore, organizations are seen as groups of self-organized networks dependent on communication. The connectionists believe that knowledge resides in the connections and hence focus on the self-organized dispersed information flow.
- (3) *Autopoietics*. Here the context of information inputs is unimportant as it is seen as data only. The organization is a system that is simultaneously open (to data) and closed (to information and knowledge). Information and knowledge cannot be transmitted easily since they require internal interpretation within the system according to the individual's rules. Thus autopoietics develop individual knowledge, and respect that process in others.

These different philosophical positions are the basis of how individuals and organizations view the practicalities of knowledge management and knowledge creation. The positivistic-scientific viewpoint of the cognitivists allows that knowledge can be codified and represented separately from individuals. The interpretive and phenomenological autopoietics sees knowledge as private and interlinked into the social context (Bhaskar, 1975; Weber, 1962). The connectionists combine private and public knowledge. Firms only exist because they are better at transferring and sharing knowledge than the market (Kogut and Zander, 1992).

Measuring IC

The increasing importance of IC is reflected in the growing number of measurement frameworks that address the measurement of IC. A review of the field illustrates that organizations measure IC for different reasons. The key reasons for organizations to measure their IC are: to formulate and assess strategy; to influence people's behavior; and to externally validate performance, which includes reporting and benchmarking (Marr and Gray, 2002; Marr *et al.*, 2003a, b, c). In the field of performance measurement there has been a strong focus on the creation of frameworks, indices and accounting guidelines to support the management of IC (see, for example, Roos *et al.*, 1997; Sveiby, 1997; Mouritsen *et al.*, 2001; Bontis *et al.*, 1999; Lev, 2001; Neely *et al.*, 2003).

Neely *et al.* (2003) illustrate the evolution of measurement approaches from static and regimented first generation measurement approaches such as the Balanced Scorecard (Kaplan and Norton, 1992) or the Skandia Navigator (Edvinsson and Malone,

1997) towards more dynamic and open representations of how value is created in organizations (see, for example, Neely *et al.*, 2002; Kaplan and Norton, 2000). A representation of a simplified value-creation map (Marr *et al.*, 2003a, b, c) is depicted in Figure 1. A value-creation map shows the pathways of how value is created in organizations. In this abridged version culture contributes to the development of know-how and better relationships, which in turn impact brand and customer satisfaction in order to deliver stakeholder satisfaction and therefore value.

Benchmarking IC

Competitive analysis has been used by organizations for many years as a means of collecting data and measures regarding the markets, sales, products, production costs, or budgets of competitors (Yasin, 2002). Companies such as Xerox Corporation, LL Beans, Texas Instruments, and AT&T have been credited as pioneers who first engaged in larger benchmarking projects (Camp, 1993; Shetty, 1993; Tucker *et al.*, 1987; Bean and Gros, 1992; Barker, 1994). Benchmarking is a multifaceted technique to identify operational and strategic gaps, and to search for best practices that can be applied to close any existing gaps (Yasin, 2002). It is generally recognized as a tool that enables a company to understand its current performance levels and set future targets (Camp, 1989). Benchmarking, which is predominately used in the service industry can have an internal as well as an external focus (Yasin, 2002). For the aim of this paper benchmarking is defined in accordance with O'Dell and Grayson (1998) as the process of identifying, understanding, and adopting outstanding practices from organizations, including your own, anywhere in the world.

Drew (1997) believes that benchmarking is one of the most popular tools for strategic management by demonstrating that all of the winners of the Baldrige award score highly on the use of benchmarking. Viedma-Marti (2001) has created an IC benchmarking system as a tool that allows organizations to benchmark core competencies or IC against best in class competitors. Viedma's IC benchmarking system builds upon the Business Excellence Model to identify factors and competencies as sources of sustainable competitive advantage. This approach is a

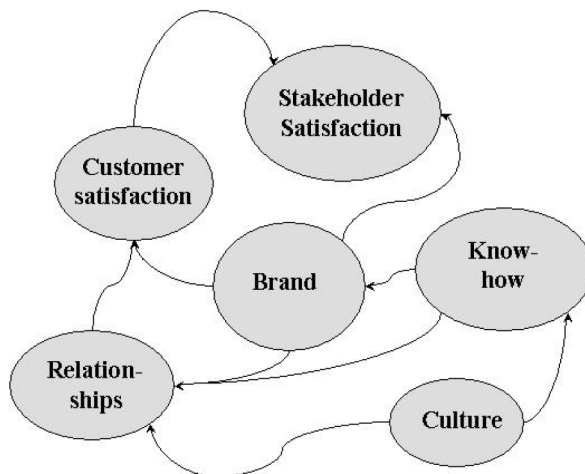


Figure 1.
Value-creation pathway
map

form of competitive analysis that might be used for business model benchmarking and allows organizations to compare core competencies. Drew (1997) argues against this method and states that companies would not want to benchmark their core competencies with competitors because they could give away their competitive advantage. Even more problematic is the belief that firms can only gain sustained competitive advantage from increasing those assets that are inimitable, not substitutable, tacit in nature, and synergistic (Wernerfelt, 1984; Barney, 1991; Rumelt, 1984; Teece *et al.*, 1997). If this is the case then it may be questionable as to the benefits accrued from benchmarking core competencies and IC. Andriessen and Tissen (2000) even state that if core competencies are no longer unique, then organizations lose their right to exist and merge into the crowd, where profits are minimal at the best.

This paper is based on the belief that the strategic benchmarking of core competencies has its place, however, as argued above, knowledge processes are the critical link between IC and business performance. In order to execute strategy organizations need to understand processes on an operational level and for this reason, the usage of operational knowledge process benchmarking is suggested. Szulanski and Winter (2002) warn that the knowledge of existing and successful processes is difficult to transfer as they are embedded in complex realities. They add that shared practices must be replicated as exactly as possible in order to be successful. Additional difficulties arise from the problem that often experts do not truly understand why some practices worked in the first place (Szulanski and Winter, 2002).

Research approach

The research presented in this paper is a combination of time-series research and case studies and consists of a longitudinal action research project in combination with more traditional case based research (Yin and Campbell, 1994). A leading R&D organization (CR&D)[1] had commissioned the author with a project of conducting research into internal benchmarking of their IC management practices. The goal was to develop a benchmarking approach that could then be implemented in CR&D. CR&D consists of eight subsidiaries in five countries. Two subsidiaries (AR&D and BR&R) are based in the same country and produce very similar output for the same market. After conducting a performance audit CR&D identified that AR&D outperformed BR&D. One of the reasons identified were more efficient knowledge management processes in AR&D. CR&D wanted to benchmark the processes of AR&D and BR&D as they were very similar in their resource structure and their outputs. Both operated in the same country and both had around 250 employees. The research was planned to be conducted in four phases. The first phase consisted of an audit of the existing IC infrastructure in both subsidiaries using the knowledge-asset map approach (Marr *et al.*, 2002). The rational behind phase one was to understand whether the two subsidiaries were really comparable. If phase one shows similar IC structures then the second phase would focus on the identification of the knowledge processes used in AR&D by conducting interviews with key people. Phase three would then concentrate on the exact transfer of the knowledge processes identified in AR&D to BR&D. The final phase of this longitudinal research project would review the success of this IC benchmarking project.

Findings

In group sessions with the senior management of both AR&D and BR&D the author conducted an audit of their IC structure in order to identify any significant differences in their IC asset base. This analysis showed that the IC base was almost identical. This gave confidence to the ability to benchmark the better knowledge processes of AR&D with the processes of BR&D. The study then proceeded to conduct a review of the knowledge process of AR&D in order to identify best practice IC management.

The review of the knowledge management processes involved interviewing 15 team leaders of R&D groups as well as ten team members. The research revealed that each team had one or two “stars” – highly creative team leaders which generated many of the R&D output themselves. These individuals were able to bring ideas together by being open-minded but had a very strong ability to consolidate ideas into output. They were backed by a culture of support from their teams who worked towards the ideas of one leader. The knowledge management processes were only existent within teams and there was little knowledge sharing among teams in AR&D. Most team members had regular communication with the team leader, and most of these communications took place face to face and over e-mail. The key component of this communication structure was the strong support culture with the team leader in the center. The majority of knowledge sharing was bi-directional between leader and team member, whereas there was little sharing between individual team members. Each team had shared databases, which were also used to codify and consolidate information for the team leader to access. Much of the knowledge transfer was one-directional from the team member to the team leader. AR&D had a strong focus on codifying knowledge among team members and storing this information for the leader to access. The emphasis of the leader was then to apply this knowledge in order to produce valuable output.

After the knowledge management processes were identified and documented the next phase was to transfer these processes to BR&D. A task force was established to overlook this process. However, very early in this process it became apparent that this would not work and that BR&D worked on a very different model than AR&D. Even though the IC base was almost identical, the way knowledge was produced in BR&D seemed very different. This led to an intermediate phase that would establish the way IC resources are used and transformed in each of the subsidiaries in order to detect differences. Further group session including team members and team leaders were conducted to establish the IC transformations and value-creation pathways. The results (presented in Figure 2) were surprising and revealed stark differences in the way IC was used in AR&D compared to BR&D.

The value-creation map of AR&D showed how the support culture strongly influences the people, especially the leaders, who then convert this gathered knowledge into intellectual property as well as directly into products and services, which generate financial success. The way team members interact is supported by practices and routines such as the regular meetings and shared databases. The physical infrastructure influences the well being of the team members in AR&D.

This part of the research revealed that BR&D operated on a significantly different model than AR&D. Instead of having the strong support culture for the leaders, the teams in BR&D function as teams and freely share knowledge within the team as well as within the whole subsidiary. The culture is open and promotes

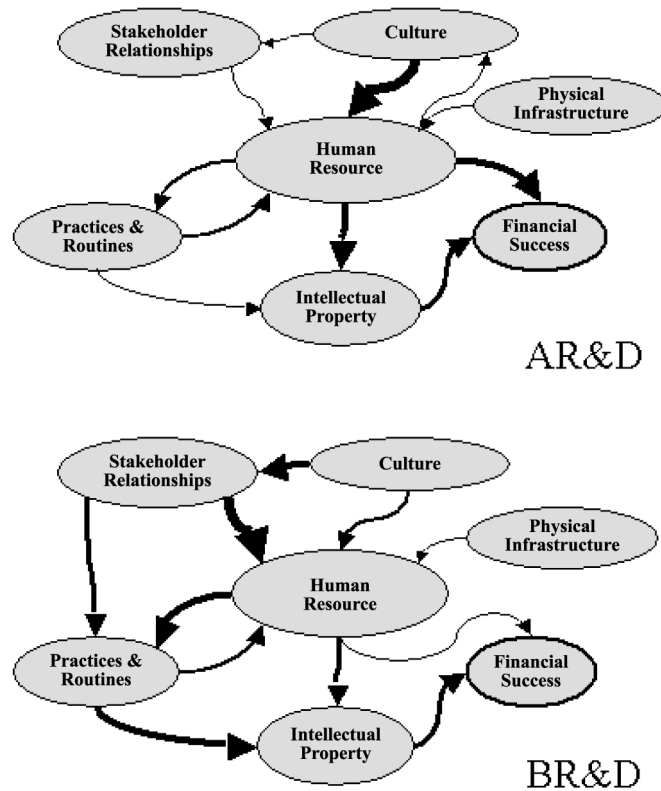


Figure 2.
Value-creation pathway
for an AR&D and BR&D

Note: Arrow width reflects strength of relationship

transfer of knowledge between internal and external stakeholders. This impacts the practices and routines and the way team members interact. There are much more ad hoc meetings between team members and output and solutions are developed between the teams. Team leaders have more a coordinating role and are less autocratic. Teams in BR&D develop output, which is then tuned into processes, patented, and sold. There are less direct services delivered by the team leaders. The predominant knowledge processes in BR&D are knowledge transfer, which takes place among all team members. Knowledge is mapped in yellow pages identifying who knows what. Knowledge is shared more casually and there is little codification during the R&D process.

This analysis prompted us to look at the corporate epistemologies of AR&D and BR&D. This lens enabled us to identify that the view of knowledge creation and therefore the management of IC were significantly different in these two R&D subsidiaries. The epistemology of AR&D seems to be positioned somewhere between cognitivists and autopoietics, whereas BR&D is much more connectionistic. At this stage it was decided that it was not possible to benchmark the knowledge processes between these two R&D subsidiaries, even though their IC structure was almost identical.

Discussion

The failure to benchmark IC management processes in these two similar subsidiaries has implications for the field of IC benchmarking. It clearly supports the argument that Szulanski and Winter (2002) put forward by stating that the knowledge of existing and successful processes is difficult to transfer as they are embedded in complex realities. They maintain further that shared practices must be replicated as exactly as possible in order to be successful. It seems that the success of knowledge processes is deeply rooted and influenced by its context. Nonaka and Konno (1998) call this context *ba* – shared space – which can be physical, virtual, or mental. It is believed that corporate epistemology strongly reflects this context and shared space. Therefore, any attempt to benchmark IC management processes must first understand whether the corporate context will allow benchmarking such practices. Marr *et al.* (2003a, b, c) suggest that it is possible to identify certain knowledge management processes that best match each of the corporate epistemologies. It is therefore not possible to successfully benchmark knowledge processes between these different contexts.

The research presented in this paper also underlines the highly dynamic nature of IC (Teece *et al.*, 1997), which implies that measurement approaches need to reflect this dynamism. In any attempt to benchmark or compare the performance of IC it is therefore important to understand the comparability of business models and context. The findings suggest that static first generation performance measurement approaches are not able to reflect the interactions or transformations along a value-creation pathway. The static measurement of IC in this research resulted in an identical picture, which led CR&D to believe that the two subsidiaries were identical in their nature. It was not until the failed knowledge transfer and the subsequent development of the value-creation maps that differences became apparent. The differences became more visible by using arrows of different widths, which reflected the strength of each relationship. This implies that measurement approaches, which are able to visualize the dynamic relationships between measures, are better able to reflect how a business really works and whether benchmarking IC will be possible.

Furthermore, the paper emphasizes the need for operational benchmarking and therefore complements the works by Viedma Viedma-Marti (2001) who suggests IC benchmarking as a tool for strategy management by benchmarking core capabilities. The research presented in this paper went deeper into the relationship between knowledge, IC and capabilities and has shown that knowledge management is the core activity for managing IC. Therefore, benchmarking the knowledge processes which enable organizations to grow and maintain their IC is critical.

Conclusion

The contribution of this paper is threefold:

- (1) The paper demonstrates that benchmarking IC on an operational level means benchmarking knowledge processes. This reflects the dynamic nature of IC and is supported by the knowledge-based view of the firm.
- (2) The research demonstrates the importance of second-generation performance measurement tools that map the relationships and transformations of IC. This ensures that organizations really understand how the business works and how IC is creating value.

- (3) In this case example the value creation seem to be closely related to corporate epistemology and it seems vital to understand the compatibility of this epistemological context before engaging in any attempt to benchmark IC.

The literature on benchmarking IC is almost non-existent and it is hoped that this paper could open up a much wider discussion on the subject of benchmarking IC. More research is encouraged in the areas of IC process benchmarking, especially in order to better understand the importance of the corporate context and corporate epistemology. Moreover, this research has implications for the field of performance measurement as well as corporate reporting. IC is a critical value driver in our society and if the context impacts the development of IC then we might have to rethink the way we report performance in order to better reflect reality and ensure that we do not compare apples with pears.

Note

1. Due to a strict confidentiality agreement with the author it is not possible to reveal the real name of the organization, therefore we will refer to it as CR&D with its two subsidiaries, AR&D and BR&D.

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