

8. Strategic change in mature sectors: when and how is intellectual capital relevant?

Cristina Chaminade and Jan Vang

8.1 INTRODUCTION

Recent years of research within the field of strategy, knowledge and innovation management have witnessed a surge of interest in conceptualizing, theorizing and testing the relationship between firms' resources and economic performance or sustained competitive advantage (Teece et al., 1997; Zollo and Winter, 1999, 2002; Wheeler, 2003). The theoretical discussion on the evolution and validity of the different strategy schools (that is, the resource-based view of the firm, transaction cost economics, the environmental and learning school, the configuration school) (Barney, 1991, 2001a, 2001b; Barney et al., 2001; Foss, 1996, 1997; Loasby, 1994; Mintzberg et al. 1998; Penrose, 1958) has run in parallel with an increasing number of empirical studies attempting to explain how firms identify and manage their intellectual capital (Cañibano et al., 2002; Nordika Project, 2001; Sanchez et al., 2000) and how IC management and reporting impacts on their performance, particularly in capital markets (Bukh, 2003; Hand and Lev, 2003; Holland, 2003; Holland and Johanson, 2003; Mouritsen, 2003). Most of this research has focused on fast-growing high-tech sectors such as IT, pharmaceuticals, electronics and financial sectors, in which knowledge is considered to be a key resource, and the capacity of the firm continuously to introduce new products and services is considered to be crucial for competitiveness (Appelyard et al., 2002; Flaherty, 2002; Henderson and Cockburn, 2002).

The literature on intellectual capital has long stressed the close links between IC and strategy (Kaplan and Norton, 1996, 2001). It has been argued that the elements of IC that are relevant for a specific firm are a function of the firm's strategic objectives (Cañibano et al., 2002). Yet, no

attempt has been made to analyse systematically the link between different strategic options with the different uses of IC (or ‘identities’ of IC as Jan Mouritsen refers to them in Chapter 10 of this volume).

The concern of this chapter is to make an empirically based contribution to filling this research gap by discussing the different roles that IC can have in supporting the strategic responses of firms to discontinuous change in the electrical utility sector in Spain. Discontinuous change (DC) can be defined as environmental change so dramatic that many of the rules driving the strategic behaviour of firms in a specific industry cease to continue (Lamont et al., 1993). DC can be the result of major technological breakthroughs (Christensen, 1997), a sudden change in the economy such as the stock market crash after the dot.com, new sources of competition, or major changes in the laws and regulations that govern an industry. This chapter is concerned with discontinuous change due to changes in the regulations.

The chapter contributes by extending the sectoral coverage of existing empirical studies – hitherto almost exclusively focused on high-tech dynamic sectors – to low-tech and mature industries. The *raison d’être* behind this suggests that if the IC models and tools can accommodate changes in mature and highly institutionalized industries there is a high probability that they might prove relevant to other less mature and institutionalized industries facing discontinuous environmental change.

The electrical utility sector consists of organizations whose principal activity is the production, transport, distribution and commercialization of electrical energy. Until 1997, the sector was a typical public sector, strictly regulated and based on geographical monopolies. With the rapid liberalization of the sector in 1997, the firms within the sector were forced to introduce major changes in their strategy and their organizational set-up and to engage in the development of new capabilities that would eventually allow them to compete in the new deregulated market. In doing so, the firms engaged in a major project to identify and measure their intellectual capital as a basis to develop the new capabilities that the new environment was demanding. This chapter will discuss how the same project served different purposes inside the firms according to their strategy, and will provide some initial reflections on the impact of the different approaches. The empirical section is based on original data and draws on fieldwork conducted mainly between 2003 and 2004. Five of the six firms that control the Spanish electrical energy market participated in the study. These firms represent – in 2004 numbers – 85 per cent of the production activity, 97 per cent of the electricity market and all transport activity. Information was gathered through semi-structural interviews with top managers of the companies.

The structure of the chapter is as follows. It begins by introducing the linkages between intellectual capital and the strategy of the firm. Next, it

introduces the recent evolution of the electrical utility sector, highlighting the strategic responses of the firms to the changes in the environment. The chapter concludes by discussing the importance of intellectual capital in two strategic reactions to discontinuous changes, as well as the differing performance between firms that actively consider intellectual capital as a strategic asset as opposed to those that do not.

8.2 THE STRATEGIC DIMENSION OF INTELLECTUAL CAPITAL

8.2.1 The Strategic Roots of Intellectual Capital

One of the key questions in the strategic management literature is how firms create, sustain and enhance competitive advantage. Among the different approaches, the resource-based view of the firm links performance to the resources and capabilities possessed by firms (Penrose, 1958; Teece, 1980; Wernerfelt, 1984, 1995). In line with March (1991), Penrose (1958) and later Wernerfelt (1984) argue that the strategy of the firm is based on both the exploitation of existing resources and the exploration of new ones. The resources that lead to competitive advantage are those that are scarce, valuable, non-imitable and durable (Barney, 1991) and difficult to imitate (Prahalad and Hamel, 1990). Specific knowledge resources tend to fulfil these criteria and it is argued that it is the firm's ability to generate, retain and use knowledge that underpins its sustained competitive advantage (Grant, 1991, 1997).

Grant's knowledge-based theory of the firm gave rise to an extensive literature on knowledge management (Nonaka and Takeuchi, 1995). The literature was very successful in raising awareness about the strategic importance of knowledge resources as the main source of value of the organization; that is, how critical knowledge resources are for the design and implementation of the strategy of the firm. However, most of the literature on knowledge management remained rather theoretical and abstract in nature, providing limited guidance on how those knowledge resources could be identified, created and developed to build a firm's strategic competitive advantage.

It was precisely this vagueness and the strong need to move to more concrete and operational ground that spurred the emergence of the intellectual capital (IC) management literature (Brooking, 1996; Cañibano et al., 2002; Chaminade and Roberts, 2003; Chaminade and Johanson, 2003; Edvinsson and Malone, 1997; Johanson et al., 2001a, 2001b; Kaplan and

Norton, 1996; Roberts, 1999; Sanchez et al., 2000; Sveiby, 1997). As acknowledged by Johanson and Henningsson in Chapter 2 of this book, the origins of the IC management literature can be explained by the interest among researchers, practitioners and policy makers to move from the prevailing theoretical – and dialectical – discussion on the importance of knowledge for the firm’s competitiveness to a more practical approach on how to identify, measure and manage effectively the knowledge resources that matter for the firm’s value creation. However, in this move the IC literature lost, somehow, the strong linkages with the strategy – that the knowledge management literature had stressed – as we will argue.

The result of the first generation of IC literature was a very simplistic yet useful framework for the identification and measurement of intangibles (Cañibano et al., 2002; DATI, 2000; DMSTI, 2003a, 2003b). As discussed in the introductory chapter of this book, IC was classified into three components: human capital, structural capital and relational capital (Cañibano et al., 2002) (see Chapters 1, 2 and 4 for a detailed description of the three components of intellectual capital). The Guidelines for the management and reporting on intellectual capital and intangibles (MERITUM and Danish) provided a framework for the identification of the intellectual capital of the organization that started with the strategic objectives. At the organization level, the analysis is cascaded. First, the strategic objectives of the organization are identified. Second, the higher-level capabilities that the organization needs to develop, maintain or reinforce in order to attain its strategic objectives are identified. Third, the next step is to identify the competences that are needed in terms of human, relational and structural capital in order to develop the capabilities identified as critical. Figure 8.1 represents the structure of the links between the strategic objectives of the firm, the new capabilities that need to be developed (or managerial challenges) and the network of knowledge resources that underpin the new capabilities (human capital, structural capital and relational capital).

The visualization of the components of intellectual capital as well as its linkages with the capabilities of the firm (or managerial challenges) and the objectives served fundamentally three purposes: measurement, management and disclosure. Arguably, during the early days of the IC ‘move’ much emphasis was put on the measurement part. There were two main reasons for that: first, there was the strong belief that only ‘what got measured got managed’, and that the management of knowledge and other intangible resources was a matter of putting numbers into those knowledge resources (measuring them) (Guthrie and Petty, 2000). Second, the IC move was initially strongly driven by researchers from the accounting field and, as Johanson and Henningsson argue in Chapter 2, there was a strong debate about how to include IC indicators in the mandatory accounts of firms.

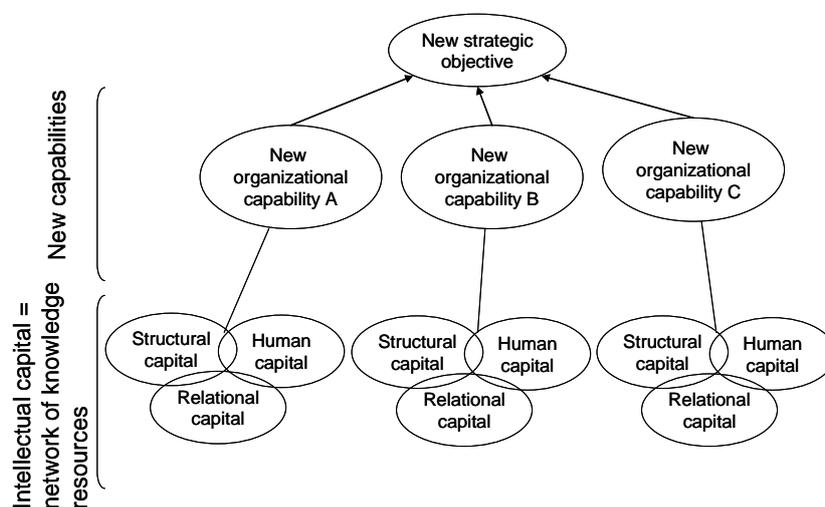


Figure 8.1 Strategic objectives and intellectual capital

However, soon it became evident that measurement without management was worse than no measurement at all, that is, that action was needed to benefit from the measurement of the intangible resources. So focus has shifted from measurement (Andriessen, 2004; Bontis, 2001) to management (Johanson et al., 2001a, 2001b; Roberts, 2003, 2006) as Figure 8.2 shows. But what happened with the strategy?

In a recent study conducted by Catasús et al. (forthcoming), the authors demonstrate that the adage ‘what gets measured gets managed’ should be modified to ‘what gets mobilized gets managed’, especially if it gets measured. That is, the key important element in creating value through the use of intellectual capital is not so much the measurement part (where most researchers have put their efforts) and not even the management part (where a great number of researchers are focusing their efforts) but the strategic dimension of it, that is, how relevant the knowledge resources are for the strategy of the firm. This has important implications because it shifts dramatically the kind of questions that the researchers in intellectual capital need to ask. The initial critical question is not about how to measure or how to manage intellectual capital resources, but what strategy the organization has and, as a consequence, how prone the organization is to mobilize intellectual capital resources.

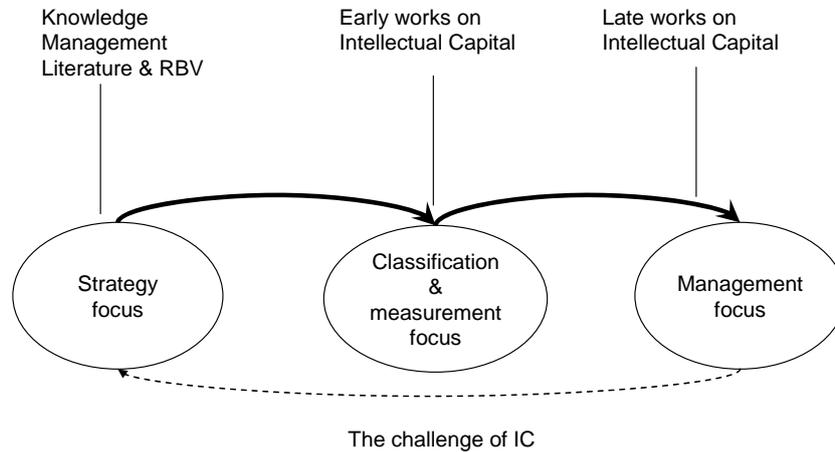


Figure 8.2 The changing focus of intellectual capital literature

8.2.2 Strategic Responses to Discontinuous Change

The strategic management literature has long been concerned with how organizations design their strategy as a response to changes in the environment. Recent contributions to the so-called environmental school consider that firms design their strategy as a response to changes in the environment (Mintzberg et al., 1998). Firms' limited strategic choice towards those changes in the environment is a function of their organizational and human capabilities (Mintzberg et al., 1998).

Changes in the environment can be classified as continuous or discontinuous in nature. How firms adapt to continuous changes in the environment has been the focus of much of the literature on dynamic capabilities that stands on the shoulders of Penrose's seminal contributions (Penrose, 1959). Dynamic capabilities are defined as 'the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments' (Teece et al., 1997, p. 516). They are considered dynamic as they change in response to continuous changes in the environment.¹

This chapter is concerned with the less studied problem of maintaining and enhancing capabilities in the context of discontinuous change. Discontinuous change can, as explained above, be defined as a radical change in the institutional, technological or economic framework within which a firm is embedded. It might be the consequence of a radical technological

change (Christensen, 1997), an economic shock or a change in the regulations that govern the industry. The deregulation and liberalization of the telecommunication industry or the electricity industry are clear examples of this latter form of environmental change. The impact of discontinuous environmental change on the firm's strategy and performance is an important area of study, since discontinuous change can restructure an industry and dramatically change the bases of competition (Meyer et al., 1990). Of all forms of discontinuous change, deregulation is considered to be one of the most drastic (Mahon and Murray, 1981; Birnbaum, 1984; Smith and Grimm, 1987; Zúñiga-Vicente et al., 2005). It is argued that deregulation and liberalization eliminates some of the institutional barriers to entry and innovation, thus opening new opportunities for the design and implementation of new strategies and to innovative responses to the environment.

According to Van de Ven and Engelman (2004) firms facing discontinuous change face two possible strategic options: (1) turning inwards, focusing on internal efficiency and the control of costs; or (2), trying to understand the dynamics of the external environment and develop new responses to these changes. The first often implies doing the wrong thing right. The second implies trying to do the right thing right, and thus profiting more efficiently from the new opportunities that the deregulated environment might offer in terms of new business opportunities. The challenge firms face stems from the fact that they have been caught in a success trap. Their dominant mindset which underpins their strategic objective and hence their core competencies has crystallized and stifled into core rigidities and routines that are hard to modify even in the event of a discontinuous change. The second response often requires undergoing a process of creative destruction involving the unlocking of the dominant mindset, unlearning and the development of new core competencies (Vang and Nielsen, 2006).

This chapter will explore the links between these two types of strategy and the importance attributed to intellectual capital within the organization by looking at the different strategic reactions to deregulation of the electrical utility sector in Spain, and the use that the electrical utility companies have made of intellectual capital indicators.

8.3 THE SPANISH ELECTRICAL UTILITY SECTOR: MAIN FEATURES AND RECENT EVOLUTION

The electrical utility sector consists of organizations whose principal activity is the production, transport, distribution and commercialization of electrical energy. The Spanish sector is dominated by six independent firms that

control 99 per cent of the electrical energy market, as Figure 8.3 shows: Endesa, Iberdrola, Union Fenosa, Hidrocantabrico and Viesgo. These five are represented in a sector organization by the name of UNESA.

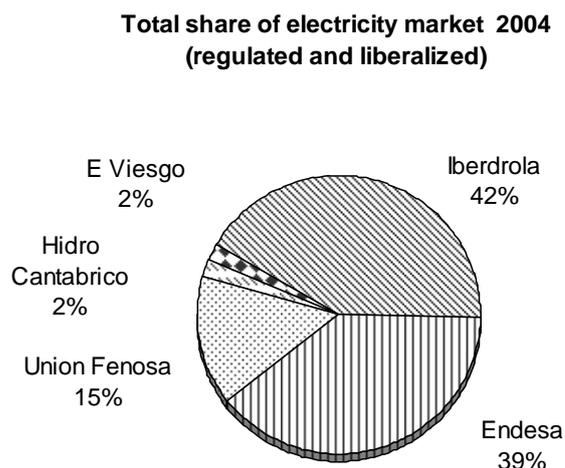


Figure 8.3 Market distribution of the electrical market

The electrical utility industry is a paradigmatic example of an industry that recently was confronted with a drastic change in the environmental conditions. The liberalization of the Spanish electrical market in 1997 had a significant impact in the institutional framework and organization of the firms operating in that market.

The industry had traditionally been a natural geographical monopoly. Firms knew their yearly income up front as the customers were captive and the final price was determined by the government. Their main concern was to increase efficiency on the supply side to reduce costs, thus increasing their margins (profits). The relation with the final customer was almost non-existent. Figure 8.4 shows the traditional value chain of the industry where each firm was vertically integrated and responsible for the generation, transport and distribution of electrical energy.

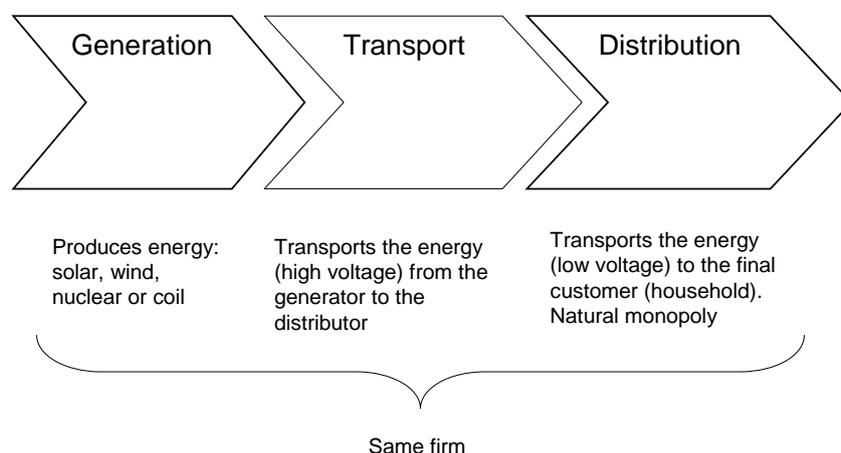


Figure 8.4 Value chain and organization of industry prior to liberalization

The sector faced radical change in 1997 when the market liberalization process was initiated in accordance with the European Union Directive 96/92CE. The new Spanish normative framework focused on the gradual introduction of market competition as well as the future integration of the Iberian market with the European market. It dismantled the regional natural monopoly of the electrical companies introducing – gradually – full competition in the final-customer segment. As compared to similar liberalization processes that took place almost simultaneously in other countries (the UK is a good example) the Spanish liberalization was faster and went further than other countries as it was accompanied by a new environmental framework and new demands for transparency of information from various stakeholders (Cañibano and Coca, 2005). This meant a radical transformation of the environmental conditions under which these firms used to operate.

The new regulatory framework eliminated any possibility of vertical integration of the activities of generation, transport, distribution and commercialization of energy. Firms were obliged to fulfil these activities by legally independent entities (ME, 1997). All firms underwent an organizational restructuring into legally independent firms (that is, vertical disintegration) that were responsible for a different stage in the energy production process. This had an impact on the value chain, as Figure 8.5 depicts.

Almost all firms decided to sell their transmission assets to Red Electrica de España (REE) (which now controls almost 100 per cent of the

country's electricity transmission network) and concentrate their activities on generation, distribution and commercialization of electrical energy (in collaboration with different firms belonging to the same business group).

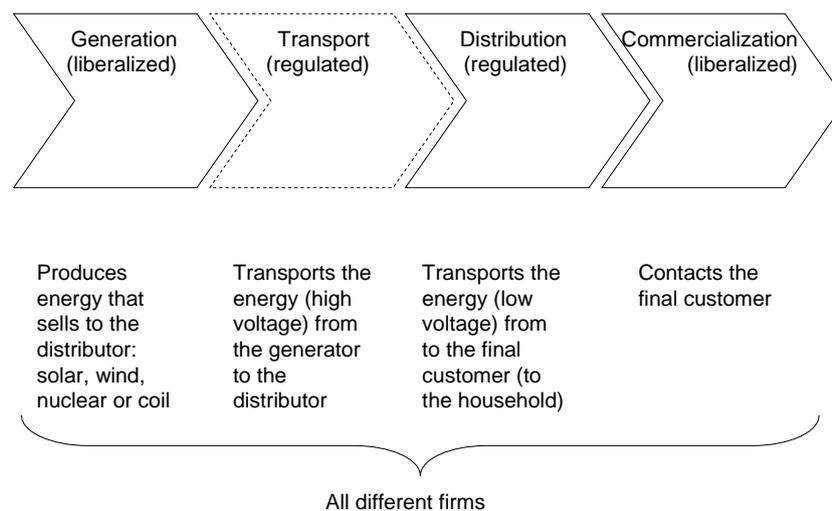


Figure 8.5 Value chain and organization of industry after liberalization

The discontinuity in the environment (that is, liberalization) ran in parallel with an increase in the environmental pressure on the industry² and firms had to respond to increasing demands for information from the various stakeholders such as the regulators, environmental organizations, shareholders, investors and employees. This placed additional pressure on the firms in terms of improving their stakeholder orientation, external communication and public relations.

In sum, firms were subject to a drastic change that obliged them to change radically their strategy, their legal organization and their processes and to develop rapidly new capabilities that could be utilized for competing in this new competitive landscape.

8.4 STRATEGIC OPTIONS AND THE ROLE OF INTELLECTUAL CAPITAL

The radical change in the competitive landscape was followed by profound changes or the need for changes in the strategy of the firms operating in the

electrical market. Following the deregulation of the sector, almost all organizations opted for a combined strategy of internationalization (that is, acquiring firms in other countries, particularly in Latin America) and business diversification (that is, into gas and telecommunications services) while simultaneously reducing costs by downsizing the workforce. A crisis in 2003 in the telecom sector together with the uncertainty and volatility of the firms' international investments led to them redefining their strategies. After the crisis, almost all organizations in the sector revised their initial internationalization and diversification strategies and refocused by returning to the energy business and deepening their focus on cost reduction and efficiency.

It was in 2003 that five of the six major firms that dominated the Spanish electrical market engaged in the so-called *Intelectric* project.³ The objective of the *Intelectric* project was to provide research-based (that is, action research) assistance to the firms in the sector to identify their key knowledge resources in order to develop the new capabilities that the new competitive landscape demanded. It was implicitly assumed that intellectual capital was relevant to all firms and that the best strategic option to respond to the new environment would be to develop new capabilities based on the acquisition and deployment of the knowledge resources within the organization. The outcome of the project was twofold: the identification of all elements of the intellectual capital report for each of the firms (strategic objectives, new capabilities, variables and indicators), as well as the deployment of an IC management plan. The findings from the *Intelectric* project constitute the backbone of the empirical part of this chapter. The collected information originates from semi-structured interviews, group discussions and the analysis of documents in the public and private domain, such as annual reports and human resource reports as well as competence maps, strategy documents, and so on. The interviews were held between 2003 and 2004. In total 58 in-depth interviews were conducted, and approximately 100 people from the firms participated in the different phases of the project (including interviews and different validation procedures of the results).

The project allowed the research team to identify the strategic objectives of the firms, the capabilities each firm had to develop in order to compete in the new environment, and the components of the intellectual capital that were most crucial to build the new capabilities and attain the strategic objectives. For example, almost all analysed firms needed to develop their ability to interact with the customer. To do so, they needed specific human resources, marketing capabilities (human capital), new systems, processes and communication channels with the customers (structural capital and relational capital) as well as a profound change in the organizational culture towards a customer-friendly orientation (structural capital). This chapter is most

concerned with the strategic objectives. Table 8.1 summarizes the strategic objectives of the firms after the liberalization.

Table 8.1 Strategic objectives of the firms after liberalization

Firm	Strategic objectives	Dominant type of strategy
Firm A	Gain efficiency (minimize costs of generation and distribution and reduce fixed costs per client in commercialization) Grow (increase number of customers, increase the installations for energy production and expand geographically the distribution grid)	Inward strategy – Reduce costs and increase efficiency
Firm B	Improve efficiency Optimize existing investments in generation Become a leader in renewable energy	Mostly inward strategy – Reduce costs and increase efficiency Main outward/innovative element of the strategy is focus on renewable energies
Firm C	Increase efficiency	Inward strategy – Reduce costs and increase efficiency
Firm D	Increase efficiency (reduce costs and increase income through diversification)	Inward strategy – Reduce costs and increase efficiency
Firm E	Strengthen the position of the firm in the Spanish market Increase efficiency of international investments and operations Establish strategic alliances to reduce investments and increase technical and commercial capacity Support the development of new business such as Soluziona	Outward/innovative strategy

Despite the fact that the firms engaged in the Intelectric project, only one of the six firms is actively managing and reporting on IC two years after the finalization of the project. If IC is relevant for all firms, why did the other firms not follow up and continue using IC? An analysis of the specificities of the strategies of the firms might provide some ex post answers to this.

While initially after the liberalization the firms in the sector adopted a strategy that combined the focus on internal efficiency with the development

and exploration of new business competencies, the situation in 2003 was polarized and close to the two opposed strategic responses described by Van de Ven and Engleman (2004). Most of the firms turned inwards to the 'old' response, which basically relies on efficiency gains through cost cutting (inward response). Only one firm, Union Fenosa, clearly opted for the outward strategy, focusing on knowledge resources as the basis for the development of new competencies and abilities to compete in the new context. The two strategic responses had important implications in the use of IC, as discussed next.

8.4.1 Intellectual Capital in the Inward Strategic Response

The analysis suggests that intellectual capital is of limited value for firms adopting an inward strategic response. Managers of the interviewed firms considered that intellectual capital could support the human resource function of the firm and, if published, improve the external communication of the company (see Chapter 10 for a detailed description of the possible identities or functions of intellectual capital). IC was not considered to be crucial to the firm's strategy, nor was it considered to be providing critical information required for modifying the currently dominant strategy. Table 8.2 summarizes the responses of the firms when questioned about the use of IC for the company.

Table 8.2 Use of intellectual capital by firm

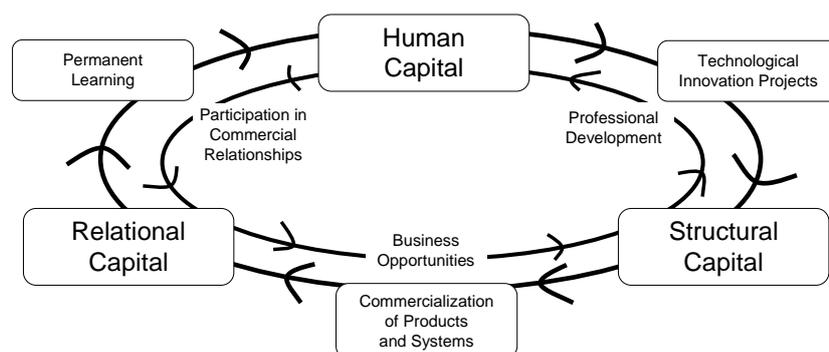
Use of IC	Firm A	Firm B	Firm C	Firm D	Firm E
1. Use of the IC report for external reporting	no	no	no	no	yes
2. Use of the IC report for HR management	yes	no	yes	no	yes
3. Use of IC report for strategy design	no	no	no	no	yes
4. Use of IC report for internal communication	no	yes	no	no	yes

8.4.2 Intellectual Capital in the Outward Strategic Response

Intellectual capital seems to be more relevant for the outward strategic response, based on the development of new competencies and businesses. A

year after the liberalization of the industry, Union Fenosa started an internal project to develop its own intellectual capital model. In the words of Fernandez-Izard, the Director of Union Fenosa Corporate University: 'we [Union Fenosa] were aware that a formalization of the management of intellectual capital was going to provide a shared vision of how intangibles and their relationships were contributing to our strategy' (Fernandez-Izard, 2005).

Union Fenosa's IC model is built around the standard three types of capital: human capital, structural capital and relational capital. It contains information on the relational flows between the three capitals, indicators which measure these intangibles and projects in process which Union Fenosa considers to contribute to generating income in the medium and long term (Coca and Chaminade, 2006; Roberts and Chaminade, 2005). Figure 8.6 plots the intellectual capital model of Union Fenosa.



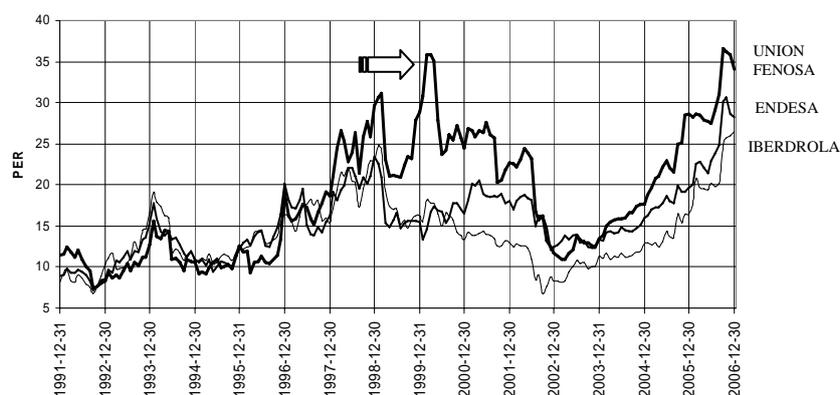
Source: Union Fenosa (2004) www.unionfenosa.es

Figure 8.6 Intellectual capital model of Union Fenosa

The link between the IC model and the strategy was clear from the start. As it stated in their annual report:

In a context of greater competition and deregulation, the sound execution of Union Fenosa's strategy depends largely on an efficient understanding of how the intangibles contribute to meeting the operating objectives and, therefore, the financial objectives. Accordingly, the Intellectual Capital Model is a tool for the planning of objectives and the communication thereof both internally to Group employees and externally to the financial community. (Union Fenosa, 2005)

The implementation of the IC model had an impact on performance and it was rewarded by the financial community (Fernandez-Izard, 2005) as it showed the commitment of the company to its knowledge resources. It was included for the first time in the annual report of 1999 and its publication had an almost immediate impact in the value of Union Fenosa in the financial markets (Garcia and Martinez, 2001), as Figure 8.7 shows.



Source: Fernández and Carabias (2006)

Figure 8.7 Evolution of the PER of the three major electrical utility companies

The IC model was not only used for external communication. As stated by the company, the model facilitates information to the employees on the strategic objectives of the company, the sources of competitive advantage of the group and the critical (intangible) aspects to monitor and control. The variables selected for the model (and for publication) are selected on the basis of the impact in the strategic objectives of the company and the competences of the group. Additionally, the model is actively used in the strategic planning seminars of the company (Fernandez-Izard, 2005).

Finally, Union Fenosa has also included some intangibles in the management control systems of the firm as well as in the management by objectives. A distinction between two types of indicators is made: those that are manageable, which are included in the business objectives; and those that are not directly under the control of the company but are important to monitor (such as the references to Union Fenosa in the media).

The focus on knowledge resources gave rise to new business opportunities like the establishment of Soluziona, a new consultancy service

company that was created to commercialize the knowledge available inside the company.⁴

In sum, intellectual capital seems to be much more relevant for those companies that opt for a strategy focused on the external environment and the search of new business opportunities than for those that have the primary strategic objective of improving internal efficiency and controlling costs.

8.5 CONCLUSIONS

The focus on intellectual capital as a source for future earnings in the firms was grounded on the consideration that IC was crucial for the strategic competitiveness of the firms. IC was valuable because it could help the firms to attain their strategic objectives and develop core competences. However in the quest to identify how to measure and manage intangibles we have lost track of the linkages with strategy. Discussions around strategy are almost absent in the literature nowadays. Furthermore, the IC community has come to believe that IC is relevant for all organizations.

This chapter makes a grounded contribution to rethink the link between strategy and the use of IC by analysing the relevancy of the IC approach for facilitating corporate restructuring in the context of (radical) discontinuous change in the environment. This is done by engaging in action-based research with the firms of the Spanish electrical utility sector. The firms faced a radical discontinuous change in the environment with the liberation of the sector in 1997. Geographical monopolies were replaced by market-based competition, increased environmental regulation and new stakeholder requirements. The research suggests that IC is not relevant for all firms, as has traditionally been claimed within the IC literature. Alternatively, we suggest that IC's value and relevance is contingent on the strategy of the firm, at least in situations characterized by discontinuous change in the environment where there is a clear distinction between inward- and outward-looking strategies. This has important implications for the IC research agenda for the future as it implies that the discussion on the relevance of IC for high-tech or low-tech industries is possibly irrelevant. It is the strategy of the firm and not the industry in which it operates that determines the importance of intellectual capital. It also alludes to a need to turn to the strategy and change management literature to discuss not only the impact of strategy on IC, but also the impact of IC on strategy or on the development of dynamic capabilities.

NOTES

1. Most of the empirical studies on dynamic capabilities have mainly focused on industries facing continuous changes in the environment – rapid-growth industries such as biomedical, pharmaceutical or ICT (Eisenhardt and Martin, 2000) and also less dynamic but also continuously changing industries such as the chemical industry (Pisano, 2002) – paying meagre attention to other firms and industries initially from more stable environments but suddenly confronted by radical change (Eisenhardt and Martin, 2000).
2. There was an increasing demand to comply with the norms set in the Kyoto Protocol and with the Johannesburg Summit. The consequence was a requirement for improvement in the environmental ('green') management of all organizations in the sector, better control of emissions, improving the management of residues, reducing the environmental impact of installations and a gradual move from nuclear energy and coal production to renewable energies.
3. In total the five firms make up 85 per cent of total production activity, 100 per cent of total transport activity, and approximately 97 per cent of the electricity market. The Intelectric project was case-study based (Yin, 1984, 1993). The collected information originates from semi-structured interviews, group discussions and the analysis of documents in the public and private domain, such as annual reports and human resource reports as well as competence maps, strategy documents, and so on. The interviews were held between 2003 and 2004.
4. Currently, Soluziona is a growing business even in times of general crises of the sector. In 2003 Soluziona grew 2.9 per cent while the other business of the group, notably those related with the electrical utility sector, showed negative rates. (-15.3 per cent in production, -6.8 per cent distribution, -15.3 per cent in gas) (Union Fenosa, 2005).

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