



# The dynamics of value creation: mapping your intellectual performance drivers

Bernard Marr

*Cranfield School of Management, Cranfield, UK*

Giovanni Schiuma

*University of Basilicata, Potenza, Italy, and*

Andy Neely

*Cranfield School of Management, Cranfield, UK*

**Keywords** *Intangible assets, Intellectual capital, Balanced scorecard, Resources*

**Abstract** *The paper highlights the importance of visual representations of strategic intent in order to understand how organizational resources – especially intangible assets and intellectual capital – are used to create value. Based on the literature the paper provides a taxonomy of organizational value drivers. Grounded in the resource-based view of the firm, which argues that organizational resources or assets are bundled together and interdependent, it then highlights shortcomings in the strategy map approach based on the balanced scorecard. The paper then introduces the value creation map that utilizes both direct and indirect dependencies to map value creation. It is suggested that this approach complements the strategy map approach by extending its view of value creation from direct to both direct and indirect dependencies. Subsequently, the paper presents a case study of how the value creation map was applied to understand the new product development process in a leading furniture manufacturing firm.*

## Introduction

Organizations perform well and create value when they implement strategies that respond to market opportunities by exploiting their internal resources and capabilities (Penrose, 1959; Andrews, 1971). Therefore, managers need to understand what are the key resources and drivers of performance and value in their organizations. Traditionally, those resources were physical, such as land and machines, or financial capital. More recently the concept of intellectual capital has been identified as a key resource and driver of organizational performance and value creation (Itami, 1987; Teece, 2000; Nahapiet and Ghoshal, 1998; McGaughey, 2002; Delios and Beamish, 2001). The concept of performance drivers suggests causal relationships between resources and organizational value creation. Penrose argues that it is never resources themselves that create value, but the services that the resources can render (Penrose, 1959, p. 25).

In order to understand how organizational resources translate into value Kaplan and Norton (2000, 2003) suggest visually mapping the causal relationships into a strategy map. Based on the perspectives of the balanced scorecard (Kaplan and Norton, 1992, 1996a, b) a strategy map contains outcome measures and performance drivers, linked together in a cause-and-effect diagram. Whereas evidence exists of causal relationships between non-financial assets and performance (Rucci *et al.*, 1998; Ittner and Larcker, 1998) there are also some critical voices (Norreklit, 2000, 2003)



---

claiming that the relationships in the balanced scorecard are logical rather than causal.

The argument of simply mapping performance drivers and outcomes also seems to break down when we take into account some of the theories put forward by the resource-based view of the firm (Wernerfelt, 1984; Rumelt, 1984; Barney, 1991). Penrose (1959), for example, argues that resources or assets of firms exist as a bundle, and others (Dierickx and Cool, 1989; Lippman and Rumelt, 1982) state, that these resource bundles impact performance with causal ambiguity and that it is difficult to identify how individual resources contribute to success without taking into account the interdependencies with other assets.

With this article we aim to demonstrate the importance of interdependencies between organizational assets, both tangible and intangible. We believe that causal approaches such as strategy maps could benefit from a better understanding of how resources interact to create value. A better understanding of value creation can then be used as the basis for validation as well as decision-making (Ittner and Larcker, 2003).

We begin this article by defining the key driver for organizational success. Next, we discuss the notion of strategy mapping in further detail and discuss its appropriateness to map how intellectual capital contributes to organizational performance and highlight some of its shortcomings. We then introduce the concept of value creation maps as a possible tool to overcome some of the shortcomings. Finally we present a case study in which we apply the value creation map.

### **Drivers of organizational performance – a taxonomy**

Over a century ago Alfred Marshall (1890), in his *Principles of Economics*, acknowledges knowledge as an important resource and a powerful engine of production. In 1959, Edith Penrose defines the economic function of an organization to be the management of its resources, which underlie the production of services. This means that the value generated is a function of the way in which resources are managed. Penrose (1959) splits resources into physical assets and human capital. In the same year Peter Drucker (1959) published an article in which he writes that business enterprises are primarily an organization of highly specialized and knowledge intensive professionals, emphasizing the increasing importance of knowledge in organizations. Hiroyuki Itami introduces the concepts of invisible assets in a book first published in 1980 in Japan (Itami, 1987). Itami defines invisible assets as information-based assets, which includes technology, consumer trust, brand image, corporate culture, as well as management skills. According to Itami (1987) they are the most important resources for long-term success because only invisible assets can be used simultaneously in several areas. In the same year as Itami's (1987) book was published in English, Johnson and Kaplan (1987) published their influential book highlighting how financially biased metrics are losing their relevance to organizations. Aaker (1989) writes that assets and skills are the basis of competition; in the same year Hall (1989) introduces the concept of intellectual assets or intangible assets (Hall, 1992) as critical value drivers. Intangible assets are defined as those assets whose essence is an idea or knowledge, and whose nature can be defined and recorded in some way (Hall, 1992). The author splits them into intellectual property (those assets for which the organization has property rights) and knowledge assets (those assets for which the organization does not have property

rights). Intangible assets drive capability differentials, which in turn drive sustainable competitive advantage, which is why organizations need to bring intangible resources and core competences into their strategic thinking (Hall, 1993).

In his 1991 *Fortune* article, Tom Stewart (1991) writes, “Every company depends increasingly on knowledge – patents, processes, management skills, technologies, information about customers and suppliers, and old-fashioned experience” (Stewart, 1991). He continues, “Added together, this knowledge is intellectual capital. He defines intellectual capital as the sum of everything everybody in your company knows that gives you a competitive edge in your marketplace”. Quinn (1992) maintains that the majority of economic and production power of organizations lies in its intellectual capability. Hall (1992) uses the classification of intangible resources and splits them into assets and skills: assets include trade marks, patents, copyrights, registered designs, contracts, trade secrets, reputations, networks (personal and commercial relationships); whereas skills are comprised of know how or culture. In a survey of 95 firms Hall (1992) identified company reputation, product reputation and employee know-how as most important contributors for overall success.

Following the pioneering work of the above-mentioned authors, various authors have defined taxonomies for intellectual capital. Hudson (1993) defines intellectual capital as a personal asset of individuals and a combination of genetic inheritance, education, experience, and attitude about life and business. Nahapiet and Ghoshal (1998) move away from a personal definition towards organizational intellectual capital; they use the term intellectual capital to refer to the knowledge and knowing capability of a social collectivity, such as an organization, intellectual community, or professional practice. Brooking (1996, 1997) goes even broader and defines intellectual capital as market assets, human centered assets, intellectual property assets, and infrastructure assets. Edvinsson (1997), former director of intellectual capital at Skandia, defines intellectual capital as human capital plus structural capital. He uses the reduction approach in the Skandia value scheme that identifies intellectual capital by deducting financial capital from overall value, which leaves intellectual capital; deducting human capital from intellectual capital leaves structural capital; deducting customer capital (customer relationships) leaves organizational capital; deducting value of processes leaves innovation capital; deducting intellectual property (patents, trade marks) leaves intangible assets as balancing value. Roos and Roos (1997) define intellectual capital in the broadest sense as human capital (knowledge capital, skill capital, motivation capital, task capital), business process capital (flow of information, flow of products and services, cash flow, co-operation forms, strategic processes), business renewal and development capital (specialization, production processes, new concepts, sales and marketing, new co-operation form), as well as customer relationship capital (customer relationship capital, supplier relationship capital, network partner relationship capital, investor relationship capital).

Although the previously mentioned authors agree on the significance of intellectual capital as a resource underpinning organizational performance, there is considerable lack of consensus on a precise definition of intellectual capital. Some, like Hudson (1993) limit the scope of the term to only individual knowledge, whereas others like Brooking (1996) and Roos and Roos (1997), also include in their conceptualization organizational relationships, infrastructure, culture, routine, and intellectual property.

---

In order to gain a common understanding of terminology used in this article we will provide a taxonomy of organizational assets below. This taxonomy is the result of an extensive literature review on the subject. Organizational assets are classified as financial assets, physical assets, relationship assets, human assets, culture assets, practices and routine assets, and intellectual property assets.

#### *Financial assets*

Financial capital has traditionally been an important asset for any organization. Cash is needed by organizations in order to invest into other resources. Itami (1987) describes that money, as one of the invisible assets of an organization, is in fact a necessary input as well as an output of operations in form of cash flow.

#### *Physical assets*

Penrose (1959) defines physical assets as tangible things such as plant, equipment, land and natural resources. Williamson (1975) emphasizes the importance of physical assets to gain a competitive advantage. Here, physical assets comprise all tangible infrastructure assets, such as structural layout and information and communication technology. It includes databases, servers, and physical networks like intranets.

#### *Relationship assets*

Relationship assets are in the relationship between an organization and its external stakeholders as well as in the exchange of knowledge between them. Relationships can include official relationships such as partnering or distribution arrangements as well as non-formalized relationships such as relationship with customers or suppliers. Roos and Roos (1997) mention relationships with customers, suppliers, network partners, as well as with investors. Itami (1987, p. 19) highlights the information or knowledge exchange between organizations and their external environment. Information flows from the firm to the external environment include corporate reputation, brand image, corporate image, and influence over the distribution channel and its suppliers.

#### *Human assets*

Penrose explicitly distinguishes human resources from other assets of the firm. Human assets are identified as a key asset of the firm. Becker (1964) and Schultz (1981) use the phrase human capital defining a core asset of an organization. Hall (1992) emphasizes skills and know-how as important assets and Roos (1998) defines human assets as the knowledge, skills, and experience of employees. Human assets, therefore include employee's skills, competences, commitment, motivation and loyalty. Some of the key components are know-how, technical expertise, and problem solving capability, creativity, education, and attitude.

#### *Culture assets*

Brooking (1996) maintains that corporate culture is an asset when the culture of an organization reinforces the achievement of the overall goals. Nahapiet and Ghoshal (1998) refer to it as social capital and context. Itami (1987) writes that corporate culture gives each person in an organization a common and distinctive method for transmitting and processing information; it defines a common way of seeing things, sets the decision-making pattern, and establishes the value system (Itami, 1987, p. 23).

---

Culture assets embrace categories such as corporate culture, organizational values, and management philosophies. Culture assets provide employees with a shared framework to interpret events; a framework that encourages individuals to operate both as an autonomous entity and as a team in order to achieve the company's objectives.

*Practices and routines as assets*

Shared knowledge in organizations is expressed in routines (Nelson and Winter, 1982) and practices. Roos and Roos (1997) classify organizational capital as important assets which include production or other processes, specialization, and flow of information. Itami (1987) also emphasizes the firm's routines to manage and transmit information as a valuable invisible asset. Practices and routines include internal practices, virtual networks and routines, these can be formalized or informal procedures and tacit rules. Formalized routines include process manuals providing codified procedures and rules; informal routines would be tacit rules of behavior or workflows. Practices and routines determine how processes are being handled and how work flows through the organization.

*Intellectual property assets*

Grindley and Teece (1997) conclude, from their studies of the semi-conductor industry, the increasing importance of patentable intellectual property. They state that patents and trade secrets have become a key element of competition in high-tech organizations and in fact claim that intellectual property is more critical than ever to competitive advantage. Edvinsson (1997) describes the intellectual property of Skandia as their patents and trade marks. Hall (1989) defines intellectual property as those assets to which the organization has property rights, such as patents, trademarks, registered designs, and copyrights, which all afford legal protection to the owners of certain classes of intellectual assets. Here we define intellectual property as the sum of assets such as patents, copyrights, trademarks, brands, registered design, trade secrets and processes whose ownership is granted to the company by law. They represent the tools and enablers that allow a company to gain a protected competitive advantage.

**Visualising value creation**

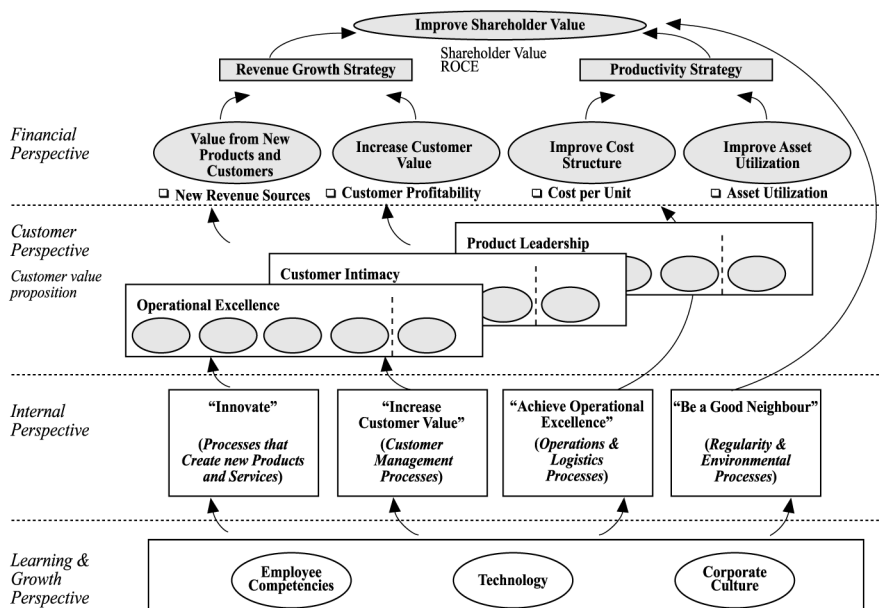
Measurement in a business enterprise determines action since it acts as a motivator of behavior (Drucker, 1959). Ridgway (1956 p. 247) writes that "even where performance measures are instituted purely for purposes of information, they are probably interpreted as definitions of the important aspects of that job or activity and hence have important implications for the motivation of behavior". However, if organizational performance is measured using a set of measures and no indication of priority is given, individuals are forced to rely on their own judgment as to what is the most important value driver.

To avoid dysfunctional consequences of performance measurement (Ridgway, 1956), Kaplan and Norton (2000) introduced strategy maps as tools to chart how intangible assets are converted into tangible outcomes. The authors maintain that strategy maps "give employees a clear line of sight into how their jobs are linked to the overall objective of the organization, enabling them to work in a coordinated, collaborative fashion toward the company's desired goals" and "provide a visual

representation of a company’s critical objectives and the crucial relationship among them that drives organizational performance” (Kaplan and Norton, 2000, p. 168).

Based on the four perspectives of the balanced scorecard (Kaplan and Norton, 1992, 1996a, b) “strategy maps show how an organization will convert its initiatives and resources – including intangible assets such as corporate culture and employee knowledge – into tangible outcomes” (Kaplan and Norton, 2000, p. 168). Figure 1 shows the template for strategy maps with its four perspectives – financial, customer, internal processes, and learning and growth.

The strategy map seems a useful tool to chart how intangibles translate into corporate goals. However, many scholars emphasize the interconnectivity of assets, especially between the different intangibles or intellectual assets. Scholars supporting the resources-based view of the firm (Wernerfelt, 1984; Grant, 1991; Petergraf, 1993; Barney *et al.*, 2001; Barney, 2001) consider the firm as a bundle of resources or assets in which the different assets depend on each other to create value. Let’s take the strategy template in Figure 1 as an example to illustrate the interrelationship between assets. The map contains employee competencies and technology, as well as corporate culture as assets and corporate performance drivers in the learning and growth perspective. Each of these assets cannot be seen separated from one another. Employee competencies, for instance, depend on the technology available in the organization. The latest technology is worth little without the right knowledge and competencies of how to operate it. In turn, all the latest understanding and knowledge of how to operate technology is worthless if employees do not have access to the technology. Following the same logic, corporate culture influences employee competencies and *vice versa*. Roos and Roos (1997, p. 419) support this view and write that a “balance sheet



Source: Adopted from Kaplan & Norton (2000)

Figure 1. Strategy map

approach to intellectual capital is inherently a ‘snapshot in time’ of the intellectual capital situation and does not provide information on the transformation from one intellectual capital category into another”. Baruch Lev (2001) notes that “intangibles are frequently embedded in physical assets (for example, the technology and knowledge contained in an airplane) and in labor (the tacit knowledge of employees), leading to considerable interactions between tangible and intangible assets in the creation of value”, he continues “when such interactions are intense, the valuation of intangibles on a stand-alone basis becomes impossible” (Lev, 2001, p. 7). In summary, this means that the contribution of one asset, lets say technology, can rarely be expressed independently from other assets, such as skills, expertise, or corporate culture.

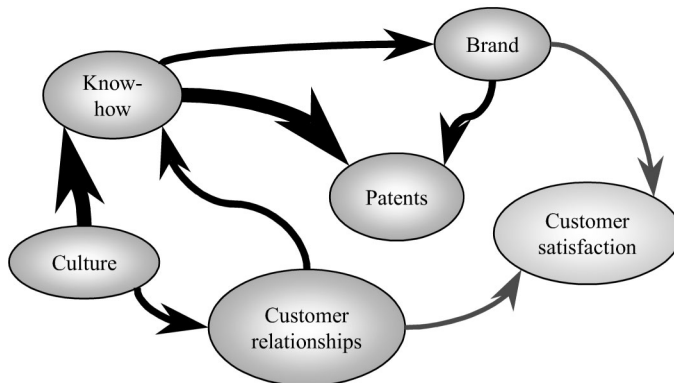
We believe that efficient management of organizational assets is impossible without understanding the interrelationships and interdependencies of such assets. We therefore suggest the mapping of direct dependencies (as done in strategy maps) as well as indirect dependencies in what we call value creation maps. Below we will outline how to develop a value creation map.

### **The value creation map – direct and indirect relationships**

The first step in designing a value creation map follows the same principles as this of designing a strategy map. The design starts from the top, from the organizational objectives, mission, and vision, in other words – why the organization exists. Differing slightly from the balanced scorecard approach, it is suggested to adopt a wider stakeholder approach when defining the organizational objectives (Neely *et al.*, 2002). Working down, the assets that represent the key value drivers are identified. To select its key value driver organizations can use a “matrix of direct dependences”. In such a matrix the organizational assets are listed in the rows, classified according to the above-mentioned taxonomy. The performance dimensions, i.e. strategic objectives, are listed in the columns. It is therefore possible to weigh the relative importance of each different asset for the achievement of each performance dimension.

The above weighting identifies the importance of the assets in an isolated and static fashion, similarly to the strategy map view. However, as indicated by various scholars, it is often the dynamic interaction of various assets that creates value. This next step, therefore, maps out how the selected key assets will help the organization to achieve its performance. In this step the interactions between the different assets as well as their overall links to performance will be visualized. A “matrix of the indirect dependences” is created in which both the rows and columns contain the identified key assets. It is possible to create a matrix for each overall performance objective. The cells of the matrix contain a judgment, expressing the level of importance, e.g. moderate importance or strong importance (the size of arrows of map shows the two levels of importance).

Using the data from both the matrix of direct and indirect dependencies it is now possible to create the value creation map for each performance dimension. Figure 2 illustrates a simplified example of such a map for the organization’s objective of creating customer satisfaction. It visualizes the value drivers and how they might interact to deliver value, in this case customer satisfaction. Below we will illustrate a case study of how the value creation map is applied in practice.



**Figure 2.**  
The value creation map

### Case study – the value creation map at Calia

In the following we present the findings from a longitudinal case study of how the value creation map was applied in the new product development (NPD) department of a world-leading furniture manufacturing firm. The main aim of this case study is to demonstrate how the theoretical framework of a value creation map can support management decision making in practice.

The reason for selecting the NPD process is based on Itami's (1987) observation that those in charge of product development combine different assets – especially different aspects of knowledge in order to develop new products. "Information flow is everywhere in the development stage" (Itami, 1987, p. 18).

Calia Salotti designs, produces, and sells residential upholstered furniture. It is a large furniture manufacturer with the leading market shares in North America and Europe. It has 600 employees and produces about 250 different models each year. In the year 2000 the company produced a turnover of US\$75 million. About 90 per cent of its production is designed for the export market in Europe and the USA.

NPD is a core process with strategic importance at Calia Salotti. Product features are predominately determined by customer needs and the design involves highly stylistic content with a limited life cycle. This explains the need for continuous product innovation. The production relies on quality based on the craftsmanship of highly skilled workers; this gives Calia a competitive advantage as it makes it difficult for other firms to imitate. The NPD in Calia is characterized by non-formalized processes that are based on know-how and knowledge with a tacit dimension, creative intuition and craftsmanship of some key individuals operating in different phases of the process.

The process of creating and applying the value creation map was highly iterative and involved a series of semi-structured interviews as well as feedback sessions in groups with managers and team leaders involved in the NPD process. In the first step to design the value creation map, the management selected the main performance dimensions it wanted to improve. In Calia's case, conformity of the prototype production with the product design was selected as a key dimension that needed improvement. Product design includes the new product concept and the design specifications. The product concept consists of designing a 1:10 scale model in various angles. The design specifications include information that identifies the model as well as the technical and non-technical characteristics required to develop the model.

Frequently the final prototype produced varies from the initial product design. The inconsistency of the prototype production with the product design causes a trial and error approach that increases the iterations between design and prototype production, and therefore increases time-to-market. The main performance indicators in the NPD process are time to prototype a new model and the number of iterations between design and production. The overall objective was to improve both indicators in order to shorten time-to-market.

Once the strategic objective was identified managers selected the key value driver, using the “matrix of the direct dependences”. Each manager and team leader completed a list of the factors that would contribute to the improvement of the conformity of the prototype with the product design. This list was created in semi-structured interviews that were based on the above taxonomy of assets but translated into their own language. The change in language was achieved through various pilot interviews to identify relevant assets in each category but using terminology and more language that was less abstract and more context appropriate. Individuals selected what they believed were the key drivers of the performance dimension in question. In a group feedback session facilitated by a senior researcher the answers were consolidated and the following assets were selected as key drivers of their performance:

- technical expertise of the designers;
- problem solving capacity;
- software for design;
- working practices; and
- manuals with codified procedures.

The next step was the identification of indirect dependences. Calia’s matrix of indirect dependencies is based on structured interviews with individual managers and team leaders in which the matrix of indirect dependencies was completed. The results of all interviews were then combined and agreed on in a feedback group session. The result is presented in Table I. By combining, both direct and indirect dependencies, it is now possible to create a value creation map. The map was created by the researchers and sent to all managers and team leaders for their feedback. After some final minor

Improvement of conformity of the prototype with the product design	Technical expertise of the designers	Problem solving capacity	Software for design	Working practices	Manuals with codified procedures
Technical expertise of designers	–	<input type="checkbox"/>	–	–	<input type="checkbox"/>
Problem solving capacity	–	–	–	<input type="checkbox"/>	–
Software for design	–	–	–	<input type="checkbox"/>	–
Working practices	■	<input type="checkbox"/>	–	–	–
Manuals with codified procedures	■	<input type="checkbox"/>	–	<input type="checkbox"/>	–

**Table I.**  
Calia’s matrix of the indirect dependences

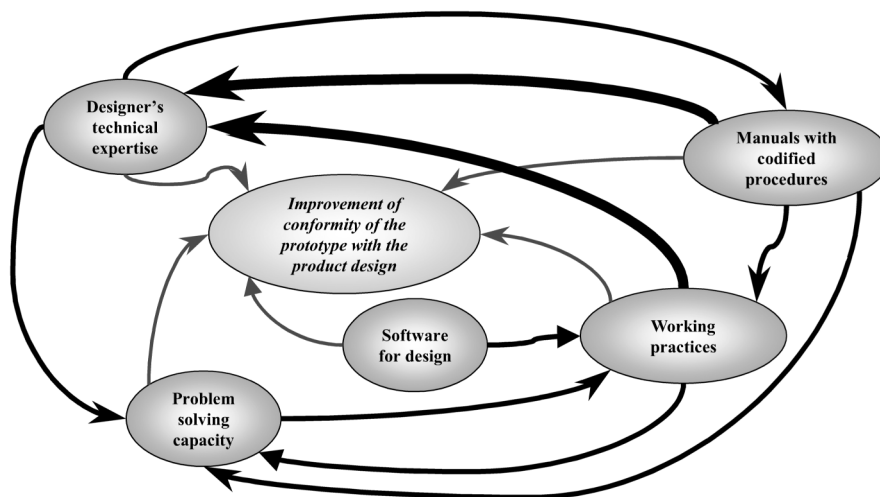
**Notes:**  Moderate importance;  strong importance

modifications the value creation map was agreed on to reflect the organizational reality. The final map is depicted in Figure 3.

Once the value creation map is drawn and consent is achieved, it can be used for communication and decision making. On the basis of the value creation map the management in Calia identified that attention needed to be focused on the working practices and the manuals with codified procedures. The following problems were identified and needed to be addressed:

- know-how gap between the person building the prototype and the designers;
- low level of technical expertise among the designers;
- absence of codified rules for design and prototyping activities;
- highly tacit working practice;
- poor integration between design and prototyping in terms of transfer of knowledge and knowledge sharing; and
- instructions by the design team for the prototype builders lack necessary technical specifications and are often quite ambiguous.

Working practices were improved by increased team working involving both designer and prototype builders. Before the product design is passed on to prototype builders, designer and prototype builders discuss the product design and identify possible problems concerning the production of the prototype. On the basis of this discussion designers can change the product design or include necessary technical specifications of the product design much earlier in the process to avoid increasing iterations between the two teams. In addition new design software was purchased and introduced to increase and improve the specifications in the product design. The software allows producing drawings in a 1:1 scale, which forces designers to specify technical details and dimensions of the product. The inter-functional team work facilitates knowledge sharing and contributes to improving the level of technical understanding and



**Figure 3.**  
Calia's value creation map

---

planning knowledge among designers and design knowledge among prototype builders.

To improve the level of codification of working practices a design manual has been produced. The aim of the manual was to externalize the knowledge, since a lot of the working practices are highly tacit in nature and rooted in the actions of individuals (Nonaka and Takeuchi, 1995). The externalization was conducted by a team of external analysts who, first of all, watched the expert designers and prototype builders and described their operational abilities. Second, they discussed their observations and descriptions with the subjects (designers and prototype builders) which resulted in correction and enrichment of the documents. The tools used in this codification process included written documents, statements in natural language, cause-effect diagrams, as well as photographs and video sequences. Today the manual is the codified cognitive property of the firm, outlining both the design and prototype production activity. It is used by designers and prototype builders in order to standardize working practices, improve problem solving capacity, and to facilitate easier access to technical knowledge about design specifications for designers.

Once these initiatives were implemented it was possible to measure the impact on the NPD performance. Both performance indicators, time to prototype a new model and the number of iterations between design and production, were significantly improved[1]. This, in turn, positively impacted time-to-market, one of the most crucial performance indicators for Calia.

### **Conclusion**

In this article we have outlined the literature highlighting the importance of visual representations of strategic intent in order to understand how organizational resources are used to create value. In order to create common understanding of organizational value drivers we provide a taxonomy of organizational assets, which is based on an extensive review of the existing literature. Grounded in the resource-based view of the firm (Wernerfelt, 1984), which argues that organizational resources or assets are bundled together and interdependent, we then highlighted shortcomings in the strategy map approach (Kaplan and Norton, 2000, 2003). We then introduced the value creation map that utilizes both direct and indirect dependencies to map value creation. It is suggested that this approach complements the strategy map approach by extending its view of value creation from direct to both direct and indirect dependencies. Subsequently, we presented a case study of how the value creation map was applied to understand the new product development process in a leading furniture manufacturing firm. The application of the value creation map allowed managers to focus their attention on the critical resources and their contribution to performance.

This research supports the thesis of earlier work claiming that organizational resources, and in particular its knowledge-based assets, are dynamic in nature (Roos and Roos, 1997) and are dependent on each other to create value (Lev, 2001; Dierickx and Cool, 1989). We therefore challenge the usefulness of strategy maps based on the balanced scorecard as a means to fully understand how intangible assets create organizational value. We call for further research to investigate the interrelationships between the different organizational assets and further investigation into approaches and tools to better understand and visualize organizational value creation.

---

**Note**

1. For competitive reasons we were unable to disclose any actual numbers.

**References**

- Aaker, D.A. (1989), "Managing assets and skills: the key to a sustainable competitive advantage", *California Management Review*, Vol. 31 No. 2, pp. 91-106.
- Andrews, K.R. (1971), *The Concept of Corporate Strategy*, Dow Jones-Irwin, Homewood, IL.
- Barney, J.B. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120.
- Barney, J.B. (2001), "Is the resource-based 'view' a useful perspective for strategic management research? Yes", *Academy of Management Review*, Vol. 26 No. 1, pp. 41-56.
- Barney, J.B., Wright, M. and Ketchen, D.J. Jr (2001), "The resource based view of the firm: ten years after 1991", *Journal of Management*, Vol. 27 No. 6, pp. 625-43.
- Becker, G.S. (1964), *Human Capital*, Columbia, New York, NY.
- Brooking, A. (1996), *Intellectual Capital: Core Assets for the Third Millennium Enterprise*, Thompson Business Press, London.
- Brooking, A. (1997), "The management of intellectual capital", *Long Range Planning*, Vol. 30 No. 3, pp. 364-5.
- Delios, A. and Beamish, P.W. (2001), "Survival and profitability: the roles of experience and intangible assets in foreign subsidiary performance", *Academy of Management Journal*, Vol. 44 No. 5, pp. 1028-38.
- Dierickx, I. and Cool, K. (1989), "Asset stock accumulation and sustainability of competitive advantage", *Management Science*, Vol. 35 No. 12, pp. 1504-11.
- Drucker, P.F. (1959), "Challenge to management science", *Long Range Planning*, Vol. 5 No. 2, pp. 238-42.
- Edvinsson, L. (1997), "Developing intellectual capital at Skandia", *Long Range Planning*, Vol. 30 No. 3, pp. 320-31.
- Grant, R.M. (1991), "The resource-based theory of competitive advantage: implications for strategy formulation", *California Management Review*, Vol. 33 No. 3, pp. 14-35.
- Grindley, P.C. and Teece, D.J. (1997), "Managing intellectual capital: licensing and cross-licensing in semiconductors and electronics", *California Management Review*, Vol. 39 No. 2, pp. 8-41.
- Hall, R. (1989), "The management of intellectual assets: a new corporate perspective", *Journal of General Management*, Vol. 15 No. 1, p. 53.
- Hall, R. (1992), "The strategic analysis of intangible resources", *Strategic Management Journal*, Vol. 13 No. 2, pp. 135-44.
- Hall, R. (1993), "A framework linking intangible resources and capabilities to sustainable competitive advantage", *Strategic Management Journal*, Vol. 14, pp. 607-18.
- Hudson, W.J. (1993), *Intellectual Capital: How to Build It, Enhance It, Use It*, Wiley, New York, NY.
- Itami, H. (1987), *Mobilizing Invisible Assets*, Harvard University Press, Cambridge, MA.
- Ittner, C.D. and Larcker, D.F. (1998), "Are nonfinancial measures leading indicators of financial performance? An analysis of customer satisfaction", *Journal of Accounting Research*, Vol. 36 supplement.
- Ittner, C.D. and Larcker, D.F. (2003), "Coming up short on nonfinancial performance measurement", *Harvard Business Review*, November, pp. 88-95.

- Johnson, T.H. and Kaplan, R.S. (1987), *Relevance Lost: The Rise And The Fall Of Management Accounting*, Harvard Business School Press, Boston, MA.
- Kaplan, R.S. and Norton, D.P. (1992), "The balanced scorecard – measures that drive performance", *Harvard Business Review*, Vol. 70 No. 1, pp. 71-9.
- Kaplan, R.S. and Norton, D.P. (1996a), "Linking the balanced scorecard to strategy", *California Management Review*, Vol. 39 No. 1, pp. 53-79.
- Kaplan, R.S. and Norton, D.P. (1996b), "Using the balanced scorecard as a strategic management system", *Harvard Business Review*, Vol. 74 No. 1, pp. 75-85.
- Kaplan, R.S. and Norton, D.P. (2000), "Having trouble with your strategy? Then map it", *Harvard Business Review*, September/October, pp. 167-76.
- Kaplan, R.S. and Norton, D.P. (2003), *Strategy Maps – Converting Intangible Assets into Tangible Outcomes*, Harvard Business School Press, Boston, MA.
- Lev, B. (2001), *Intangibles: Management, Measurement, and Reporting*, The Brookings Institution, Washington, DC.
- Lippman, S.A. and Rumelt, R.P. (1982), "Uncertain imitability: an analysis of interfirm differences in efficiency under competition", *Bell Journal of Economics*, Vol. 13 No. 2, pp. 418-38.
- McGaughey, S.L. (2002), "Strategic interventions in intellectual assets flows", *Academy of Management Review*, Vol. 27 No. 2, pp. 248-74.
- Marshall, A. (1890), *Principles of Economics*, Macmillan, London.
- Nahapiet, J. and Ghoshal, S. (1998), "Social capital, intellectual capital, and the organizational advantage", *Academy of Management Review*, Vol. 23 No. 2, pp. 242-66.
- Neely, A., Adams, C. and Kennerley, M. (2002), *The Performance Prism: The Scorecard for Measuring and Managing Business Success*, Financial Times/Prentice-Hall, London.
- Nelson, R.R. and Winter, S.G. (1982), *An Evolutionary Theory of Economic Change*, Harvard University Press, Cambridge, MA.
- Nonaka, I. and Takeuchi, H. (1995), *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press, Oxford.
- Norreklit, H. (2000), "The balance on the balanced scorecard – a critical analysis of some of its assumptions", *Management Accounting Research*, Vol. 11 No. 1, pp. 65-88.
- Norreklit, H. (2003), "The balanced scorecard: what is the score? A rhetorical analysis of the balanced scorecard", *Accounting, Organizations and Society*, Vol. 28 No. 6, pp. 591-619.
- Penrose, E.T. (1959), *The Theory of the Growth of the Firm*, John Wiley, New York, NY.
- Petergraf, M.A. (1993), "The cornerstones of competitive advantage: a resource-based view", *Strategic Management Journal*, Vol. 14, pp. 179-88.
- Quinn, J.B. (1992), *Intelligent Enterprise: A Knowledge and Service Based Paradigm for Industry*, Free Press, New York, NY.
- Ridgway, V.F. (1956), "Dysfunctional consequences of performance measurements", *Administrative Science Quarterly*, Vol. 1 No. 2, pp. 240-7.
- Roos, G. and Roos, J. (1997), "Measuring your company's intellectual performance", *Long Range Planning*, Vol. 30 No. 3, p. 325.
- Roos, J. (1998), "Exploring the concept of intellectual capital (IC)", *Long Range Planning*, Vol. 31 No. 1, pp. 150-3.
- Rucci, A.J., Kirn, S.P. and Quinn, R.T. (1998), "The employee-customer profit chain at Sears", *Harvard Business Review*, Vol. 76 No. 1, pp. 82-98.

- Rumelt, R.P. (1984), "Towards a strategic theory of the firm", in Lamp, R.B. (Ed.), *Competitive Strategic Management*, Prentice-Hall, Englewood Cliffs, NJ.
- Schultz, T.W. (1981), *Investing in People: The Economics of Population Quality*, University of California, Berkeley, CA.
- Stewart, T.A. (1991), "Brainpower", *Fortune*, 3 June, pp. 44-56.
- Teece, D.J. (2000), *Managing Intellectual Capital: Organizational, Strategic, and Policy Dimensions*, Oxford University Press, Oxford.
- Wernerfelt, B. (1984), "A resource based view of the firm", *Strategic Management Journal*, Vol. 5 No. 3, pp. 171-80.
- Williamson, O. (1975), *Markets and Hierarchies*, Free Press, New York, NY.