
Intangible Assets and Value-Based Network Control in the Automotive Industry. Part 1: The role of a intangibles-based analysis of the value creation system – the example of Toyota

by [Jürgen H. Daum](#)*

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Bibliography

This article is an outcome of the work of the author for the German roundtable “Network-Based Management/Network Value Added in the Automobile Industry” founded by the European Business School, Oestrich-Winkel/Germany, and several German car manufactures and automotive suppliers. This article has been published in German in: Gleich, Ronald (editor): Network Value Added – Planung und Steuerung von Netzwerken in der Automobilindustrie, Forschungsbericht aus der Reihe General Management der Supply Management Group, St. Gallen/Switzerland, 2004, p. 123-182

* *Jürgen H. Daum* is Management Advisor, Finance & Enterprise Control Expert, and Chief Solution Architect of the Business Solution Architects Group EMEA of SAP (based at the SAP headquarters in Walldorf/Germany). For the CFOs, controllers and other finance professionals of many European companies he acts as an idea generator and catalyst for redesigning the finance organization and the enterprise control system. He regularly publishes articles in journals, speaks at conferences on enterprise management and finance topics, and runs workshops with finance professionals. He is the author of *Intangible Assets and Value Creation* (Wiley, 2003). Before joining SAP in 1992 he was the CFO of a mid-sized German company.

Web site: <http://www.juergendaum.com> , e-mail: jhd@juergendaum.com

Abstract: *In addition to continue to come up with technical innovations such as the development of environmentally friendly cars, one of the biggest challenges for the automotive industry in the coming years and decades will be to create value by significantly enhancing the individual experience that customers have with its products, i.e. to move to a comprehensive customer value-based approach. For car manufacturers (OEMs), two factors will play a crucial role in this endeavor. First, their ability to create value while continually increasing productivity in the entire enterprise network (together with suppliers, development partners, distribution partners, service partners, and so on). And this means that they have to find new ways of collaboration in order to better control the complex value creation system engendered by a comprehensive customer value-based approach. Second, their ability to increase their value potentials and those of their partners, which simply means being able to manage the company or network in such a way that makes best use of their intangible assets and those of partners. This is the only way to sustainably create customer value and generate adequate financial returns. Intangible assets, however, can only develop their power to create value for customers, shareholders, and other stakeholders within a specific enterprise value creation system and therefore should not be considered in isolation within enterprise management. The present article will illustrate these points, provide an introduction to Intangible Assets Management, and establish an initial point of departure for enterprise management in the automotive industry taking intangible assets into account (from the perspective of an OEM), based on the example of the value creation system of Toyota Motor Corporation. The second part of this article, which is planned for the next research report of the working group "Network-Based Control/Network Value Added in the Automotive Industry" will then investigate how the insights gained in this article can be developed into a comprehensive model of network management based on intangible assets.*

1 The Need for an Intangible Assets¹ Perspective

The ability to create economic value – customer value, shareholder value, and stakeholder value – is no longer based on the traditional industrial production factors of manual work, financial capital, and tangible assets but on what are called *intangible assets*, which refers to the availability of “intangible potential for the future” in form of talented knowledge workers, productive relationships with business partners and customers, the familiarity of the company's name, products, and brands, innovation power, and efficient and effective processes in development, production, marketing, and customer service. Intangible assets are today the main element responsible for a company's ability to innovate and create value in a dynamic and competitive global environment. Just as importantly, they enable a company to set itself apart from the competition and attract customers, investors, and other stakeholders and retain them over the long run.

Intangible assets are therefore one of the essential foundations for the competitiveness of companies and entire economies. Value, which may be defined as returns that exceed the cost of capital, can often be produced only through continual innovation and by establishing productive relationships with customers, partners, and important opinion makers – that is, through investments in intangible assets. Even in traditional industries such as the chemical industry, such investments provide returns that today far exceed the cost of capital and investments in tangible assets.² Thus it is not surprising that companies in all branches are investing more in intangible assets than ever before – and the trend continues to point upward. In the OECD countries, investment in the production of knowledge capital such as research and development drew even with the volume of investment in tangible assets in 1999³ and has exceeded it since then. Even many companies in traditional industries own significant intangible assets whose value in some cases is higher than the intangible assets of companies in knowledge-intensive sectors such as the software industry.⁴ Yet these assets are not reflected in their balance sheets.

And that is precisely the problem. The tools we use for management, financial reporting, and management accounting have not kept pace with these developments. They were conceived during a different economic era and are still oriented towards the value creation systems and industrial production factors of that age: manual labor, financial capital, and tangible assets such as factories and machines. As a result, these tools suffer from a narrow perspective that excludes intangible assets – the nonmonetary, nonmaterial production factors and their inherent productive forces and risks. In view of the fact that intangible assets are the central production factors of today's knowledge and service economy, this is a significant limitation and has led to a widening gap between companies' market values and that which is reported in their traditional accounting systems. The past few decades have in fact seen a continuous

¹ The literature also uses the term *intellectual capital* or *intellectual capital perspective*. The terms *intangible assets* and *intellectual capital* are therefore used synonymously in this article.

² See Aboody/Lev (2001), pp. 18-21.

³ See OECD (1999), p. 2.

⁴ See GU/LEV (2001), p. 12.

increase in the share of intangible assets that are not reported in balance sheets yet constitute part of this market value. For S&P500 companies, this share has increased from an average of 38% of market value in 1982 to more than 80% in 2002.

There is therefore a clear need for action. It is true that academia and a few pioneering companies, mainly in North America and Scandinavia, already turned their attention toward this problem in the early 1990s⁵ and that a second or third generation has arisen since then to develop these ideas into practical solutions. But the CFOs, i.e. the people in charge and directly concerned with financial reporting, corporate reporting, and internal management systems, have only recently begun to take note of this development, although they are now increasingly becoming aware of its significance. There are a number of reasons for this heightened awareness, including the following:

- **IAS/IFRS⁶:** The new International Accounting Standards, which will become effective in 2005 and apply to all European corporations, include the fair value accounting principle which is intended to draw attention to *all* existing values in a company. In particular, the new method of handling goodwill (disclosure of intangibles, annual impairment test) – which is new for Europe and based on the corresponding US GAAP rules – require management to concern itself with intangibles in both financial statements and management accounting. This is because unanticipated impairments directly affect profits and can therefore reduce the confidence of capital markets in the ability of management to generate value from investments. The new IFRS regulations will therefore necessitate periodic inventories of intangible assets and compel management to take proactive steps to prevent impairments from arising in the first place. Few companies, however, possess the internal accounting tools that make this possible, and even the IFRS regulations disregard most internally produced intangibles.⁷
- **The trend toward outsourcing:** The increasing deregulation of markets and the rise of new information technologies are making jobs mobile that were scarcely regarded as such just a few years ago, such as in research and development, customer service, or finance, management accounting and administration. This enables companies to concentrate such activities (so-called corporate shared services) at locations where employees have high levels of education and training but wages are low. From here it is only a short distance to the next step of outsourcing some of these services completely. Companies that look more closely into these options, however, are learning that focusing exclusively on the cost side is not sufficient. The cost factor alone does not enable decisions to be made whether the loss of know-how and future potential entailed by outsourcing really only affects non-value areas or whether strategic potentials (intangible

⁵ See Stewart (1997); Sveiby (1997); Edvinsson/Malone (1997).

⁶ IAS = International Accounting Standards. IFRS = International Financial Reporting Standards.

⁷ In the opinion of the author, the value of intangibles should not be included in financial reporting but in a second, parallel reporting track. Financial reports could, however, include breakdowns showing for example which amounts are invested in intangibles or the expenses and revenues associated therewith (see DAUM (2002), pp. 338-347).

assets) are being lost that may urgently be required again in a few years. There is clearly a need for planning, decision support, and control systems that do not neglect intangible assets.

- **Today's focus on organic growth:** After the M&A wave in the second half of the 1990s and the enormous destruction of wealth following the collapse of the stock market bubble starting in 2000, pure M&A-based growth strategies are regarded with great skepticism and are now rarely implemented. Acquisitions have proven to be too expensive and the expected gains in value due to expected synergy effects could not be realized in many cases. Most companies have therefore shifted their focus to organic growth. This shift moves factors into the spotlight that comprise the internal value of the company and that can generate value and growth: intangible assets in the form of customer relationships, service and innovation competence, the network of marketing, development, and manufacturing partners, and so on. From this perspective, too, companies are increasingly becoming aware of the need for new planning and control instruments with which these intangible potentials can be systematically developed and optimally utilized for profitable growth – even for the rare occasion of evaluating a possible merger or acquisition. In that case this would help in deciding how best to integrate the new company, since in most cases it is the internal or acquired intangible assets that are the actual value drivers or success factors that justify an acquisition or a merger

Therefore, many CFOs and controllers have started to show interest in how intangible assets can be included in their enterprise control systems.

2 Introduction to Intangible Assets

The first step in developing management control tools that take intangible assets into account is to extend the concept of resources. Traditional management accounting tools are all based on a very limited definition of resources. As a rule, only physical and financial resources (tangible assets, inventories / working capital) are considered to be resources. With rare exceptions,⁸ the balance sheet and the accounting and enterprise control systems of most companies today disregard intangible assets – elements that now play such a crucial role as resources and production factors (see figure 1). These include:⁹

- **Human capital:** Know-how and specialized knowledge of individual employees, social competence, business attitudes, innovation capability and responsiveness, and so on.
- **Relationship capital:** Customer capital (brands, relationships with loyal customers, expected sales orders, and so on), partner capital (relationships with business partners on the supply side, marketing networks such as dealer networks or licensing relationships on the sell side)

⁸ E.g., intangible assets for which a price premium in the form of goodwill is paid in shareholding arrangements, active patents or licenses, etc.

⁹ See DAUM (2002), p. 32 ff.

- **Structural or organizational capital:** Business infrastructure in the form of processes, working methods, information systems, and databases that represent codified knowledge about customers, products, projects, and processes, as well as intellectual property in the form of patents, copyrights, trademarks, and so on.

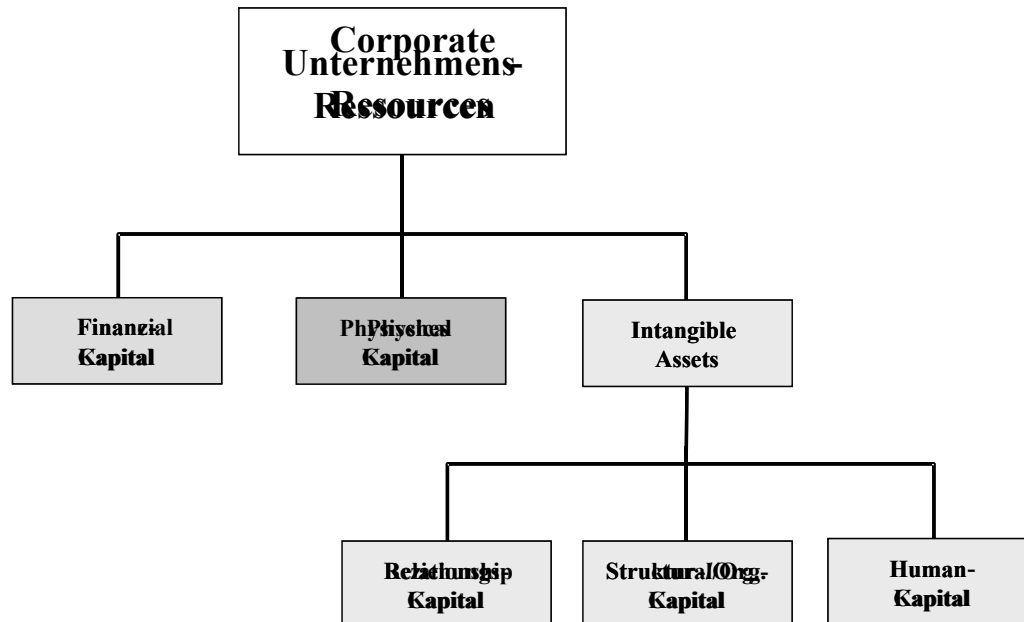


Figure 1: Resources and value components of an enterprise

The achievement of the pioneers of intangible assets management was to draw attention to the fact that companies and non-profit organizations today require management systems that take intangible resources into account. How companies actually create value from invested capital can only be made transparent with such systems. The traditional view of returns on assets, according to which added value – i.e. returns above the cost of capital – is created by means of investments in production facilities that increase the capacity (for the output per period, or “top line growth”) and/or reduce costs through higher efficiency (“bottom line growth”) is inadequate in today’s knowledge economy. Instead, it is necessary to understand how successful a company is in converting valuable and expensive human capital into structural capital that is easily scalable (such as in the form of process definitions or documented working methods) and into relationship capital (trademarks, customer relationships, partner relationships) in such a way that enables the enterprise to apply physical capital or resources more efficiently and thus increase the enterprise total factor productivity¹⁰ and thus optimize financial returns. In economic terms, this is about the capability of the company to effectively and efficiently convert, through its value creation system, financial input resources (invested financial capital) into nonmonetary resources and potentials (tangible and intangible) and to convert these in turn into financial resources (revenues). Here it is important to keep one’s eye on the entire value creation process or value creation system, because the simple availability of a valuable resource does not in itself create value. Companies must also be in a position to use resources effectively and efficiently – that is, they must be able to convert them into the highest possible

¹⁰ See Lev/Daum (2003), Lev/Daum (2004).

customer value and then into the highest possible free cash flow without endangering the company's fundamentals or long-term viability. This requires transparency not only of the relevant resources but of the conversion processes themselves (see figure 2).

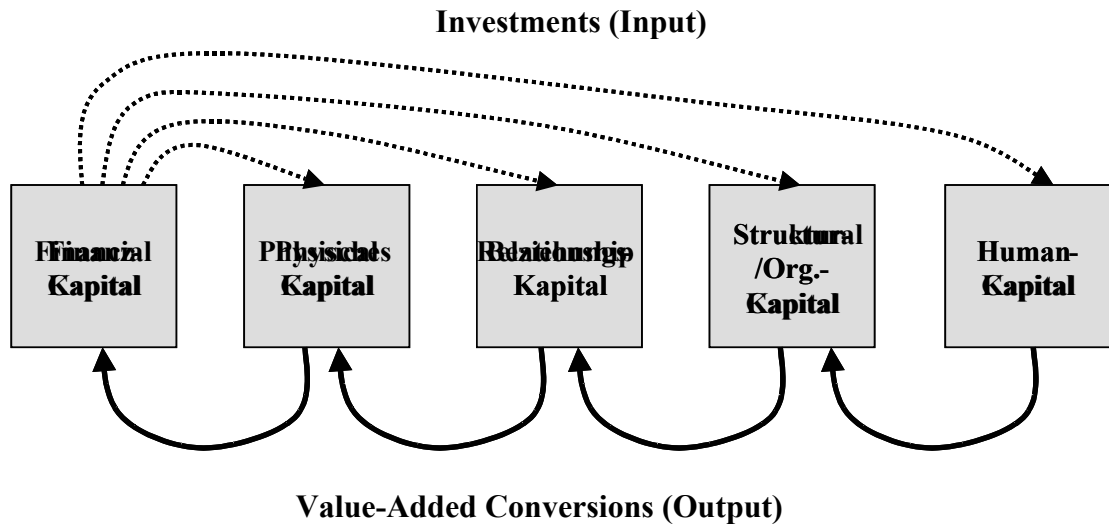


Figure 2: Conversion of resources in an enterprise value creation system¹¹

The ability to convert or transform resources is especially important regarding intangible assets, since their value can only be expressed in concrete contexts and in combination with other resources. Without support systems and multipliers, which are themselves resources, companies are not in a position to convert the potential represented by their intangible assets into customer and shareholder value. Worse, without such instruments the value of investments in intangibles can evaporate much more quickly than the value of (bad) investments in tangible assets. Here are a few examples:¹²

- Investment in human capital, such as in the form of training courses, only generates financial value through lower costs or higher revenues if it is combined with structural capital such as *optimized business processes* and if the *right information systems* are available to enable the new knowledge to be applied effectively.
- Even a large patent portfolio has only limited value without an *intellectual property management system* that enables systematic monitoring of all patents for the purpose of discovering new patent applications (and therefore value potential) and tracking the corresponding projects and programs.
- Investment in product development can only increase market share enough to cover development costs and generate a profit if the company has *relationships with potential customers for the products* or *marketing partners* that are capable of quickly marketing the product before competitors can react (and destroy the capability to yield the margins required).

¹¹ Based on Roos (2004), p. 5.

¹² See Lev/Daum (2003); Lev/Daum (2004).

Since the value of intangible assets can only be expressed in a concrete context, a critical factor is the management of the overall value creation system that constitutes the framework in which company resources, tangible assets and intangible assets, are created and exploited. An important factor in this type of enterprise management approach that is directed toward achieving sustainable company success and value creation is its capability for strategic control and performance control that takes intangible assets into consideration.

The task of strategic control (**strategy management**) is firstly to bundle the potentials, resources, and processes of an enterprise into a unique “value recipe” for creating value added (= the design of the value creation system). Secondly it is to identify the gaps in potentials, resources, and processes that are preventing the realization of a certain overall goal (such as to reach a particular position in the market) and to close them by means of appropriate change programs and initiatives that create *new* potential and resources required to achieve the enterprise’s strategic objectives. Because risk involved with intangible assets concerning the sustainability of their value is much higher than risk involved with tangible assets, companies that have a high proportion of intangible assets must therefore be in a position to continuously adapt their value recipes to changing market and technology conditions. Therefore, thirdly, the task of strategy management is also, to adapt its strategic initiatives to create potential for the future on a continuous basis. External enterprise assessment and internal enterprise control must be aware of how successful a company is in proceeding in building up the capabilities it needs to be able to survive in the market and maintain its competitive advantages.

The task of performance control (**performance management**) is to control and optimize the existing valuation creation systems that converts *existing* resources and assets into value added in order to produce optimum economic performance from these resources and assets.

Both tasks require a high-level view of the status and development of existing resources and potentials (“stocks” of financial resources, tangible assets, current assets, and intangible assets) and of the ability of the company to convert them into value by means of its value creation processes (“flows” of operational processes, support processes, and strategic change processes). If successful, this will deepen the understanding of the company’s value creation engine and can be used for decision support in performance management or strategy planning. Only then is it possible for the production factors and conversion processes that are not being captured in accounting and enterprise control systems, and which are the true value drivers, to become transparent. This is crucial because these production factors and conversion processes form the basis for productivity (creating value added from input factors), for strategic change capability (sustainability – sustaining the capability for productivity) and consequently for the capability for producing sustainable value added. Only when this is transparent can management understand how the company really creates value, and only then can the corresponding areas be made accessible for systematic management intervention.

The intangible assets perspective plays a critical role in revealing these hidden dependencies in the value creation system. To illustrate this, the following simplified

example compares two consulting firms. Since the assets of such firms are mostly intangible, the crucial role of these assets can easily be seen.¹³

Company A uses a business model that is based on the personal abilities of its consultants, who have very high levels of skill and experience in solving problems. Customer problems are usually extremely complex and must be handled individually, and the personal relationship of the consultant to the customer is of prime importance. The value creation system of company A is therefore based partly on some working capital and a few fixed assets that are needed to run the business. But it is mainly based on the human capital represented by the consultants and on the personal relationships they have with their customers. Value is created and money earned through the conversion of two resources. First, the professional competence of the consultants enables them to charge high fees. Second, the personal customer relationships they have bring in new commissions from the same customers without significant marketing efforts, and probably allow them to charge even higher fees since their personal knowledge of their customers enables them to provide customized solutions that create a high level of value for the customers, which consequently increases the customers' willingness to pay high consulting fees. Part of the earnings is reinvested in measures intended to strengthen customer relationships (such as restaurant dinners, invitation of customers to exclusive events, and so on) and to maintain or increase their professional competence (training courses, attending industry conferences, research projects, etc.). The value creation system of company A can approximately be represented by the resource map in figure 3. It is important to note that company A has almost no structural capital other than a method database and documentation of previous customer projects. There are no fixed processes: each customer project is handled individually. The advantage is that the company is flexible and can quickly respond to customer requests and changes in the market. The disadvantage is that it cannot easily expand because its competencies and resources that reside in the individual human capital of the consultants are not scalable (in contrast to structural capital that is scalable). The only way to grow is to train new consultants by the existing consultants in an individual way, one-by-one, like in a traditional craftsman-apprentice relationship - which is an expensive and time-consuming process. However, this very lack of scalability also has an advantage in that competitors cannot easily copy such a model, since establishing the necessary competencies would take too long or may even be impossible in a competitive situation. Company A therefore runs little risk of "commoditization." Its value creation model is what is known as a "value shop."¹⁴

¹³ Based on CHATZKEL/ROOS (2002), pp. 98-100.

¹⁴ STEWART (2003), pp. 69-70.

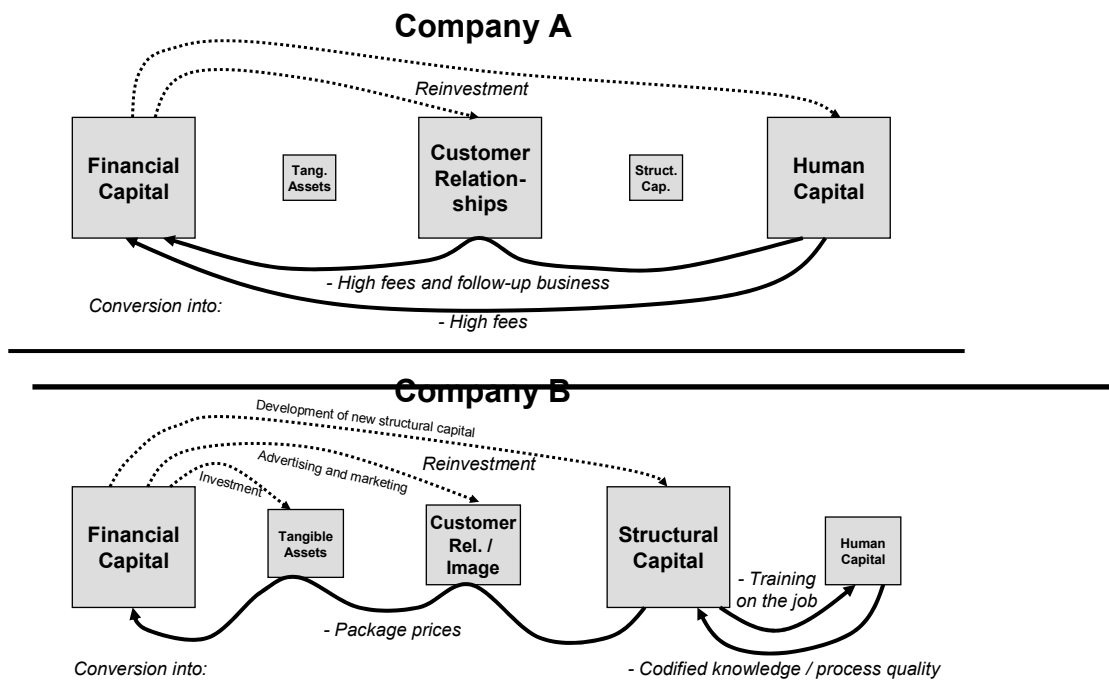


Figure 3: Resource map of companies A and B

Company B uses a different business model. Instead of selling the know-how of its individual consultants, it provides finished solutions as a package, often at a package price. These packages are applied to known standard problems, such as those in a particular branch of industry, that company B often solved in the same or very similar form in the past. The concepts and processes involved are documented in detail, making it possible even for relatively inexperienced consultants to solve customer problems. In this model, the individual relationships between customers and consultants only play a subordinate role. Customers choose company B not because of the skills of a particular consultant but because company B has the image of being able to successfully implement similar projects in a particular industry and area. For company B, new consulting contracts tend not to be the result of customer initiative as is the case with company A (where the customer contacts “his” consultant when a new problem arises). Instead, company B has to actively market itself and “sell” its consulting projects. It therefore needs a support function called “marketing.” In addition, a “development” function is needed that integrates new knowledge from customer processes into the existing processes or establishes new processes for solving customer problems in new areas. Overhead and the costs for tangible assets are much higher for company B than for company A, which only requires a few secretaries. However, this disadvantage is offset by greater scalability. Company B can expand more easily, such as by hiring university graduates and assigning them directly to projects where they receive on-the-job training. But at the same time company B is much less flexible because it takes a relatively long time before a new idea can be incorporated into a standard product. Company B therefore requires less human capital, since it only needs consultants with average competency. On the other hand, it requires more structural capital in the form of documented processes, intellectual property, project management methods, information systems, organizational structures, and training methods, which enable average consultants to provide good solutions. The customer capital of company B is not represented chiefly by personal relationships between their consultants and customers

but by the brand name — the familiarity of the company's name and its image in the market. The critical resources with which company B creates value are therefore its structural capital and its brand name. Only a small part of the revenues are generated from the consultants' human capital (average to low hourly rates for tasks such as standardized analyses and implementation support). Most of the revenues come from converting structural capital when the customer pays the package price for the standard solution that includes a (considerable) margin. The amount of revenue that can be received is closely tied to the strength of the brand name, which means that some of the revenue from the standard solution is actually being generated by conversion of the brand.

Instead of the "value shop" model of company A, in which complex individual customer solutions are provided and a high proportion of human capital contributes to value creation (this can also be called the "workshop" model), Company B is based on a model which Porter calls the "value chain." A value chain model is made up of standardized, sequentially executed process steps that convert input into output. The goal is to set up an efficient "mass production" factory by standardizing processes and products. Compared with the value shop model, this model has a lower share of human capital involved in value creation but a higher share of structural capital.

For company A, the critical resources and assets are the consultants themselves. If their consultants were to die in a plane crash, for example, the company would cease to exist. Company B, however, would simply hire new consultants and hand them the documentation. There are thus significant differences between the two companies with respect to both their internal business logic and their resource or asset structure. From the financial perspective of cash flows and balance sheets, the two companies could look exactly alike: the same revenues, margins, and balance sheet structure. The differences only become apparent from the perspective of intangible assets, which reveal how a company actually creates value. Intangible assets identify the key competencies, resources, and assets, and show how they are converted through processes and structural capital to generate customer value and the revenues and cash flows that result from it. They also indicate how fit the company is for the future and which risks it carries. Only with the intangible assets perspective is it possible to judge how efficiently a company creates value added, and the probability that it can maintain this capability in the future.

The intangible assets perspective is therefore the foundation of a new, enhanced enterprise model that goes beyond the traditional accounting-based approach. While a financial or accounting perspective measures the actual situation of a company from a financial point of view (financial inputs in the form of investments and expenses versus financial outputs in the form of profit or free cash flows), the intangible assets perspective adds to this the understanding of the complex interrelationship between resources and conversion processes so that management can better understand their true value drivers and value creation processes in order to in order to manage and control future financial performance. Only with such an approach can the true drivers and processes of value creation be optimized and the enterprise total factor productivity continuously improved (see figure 4).

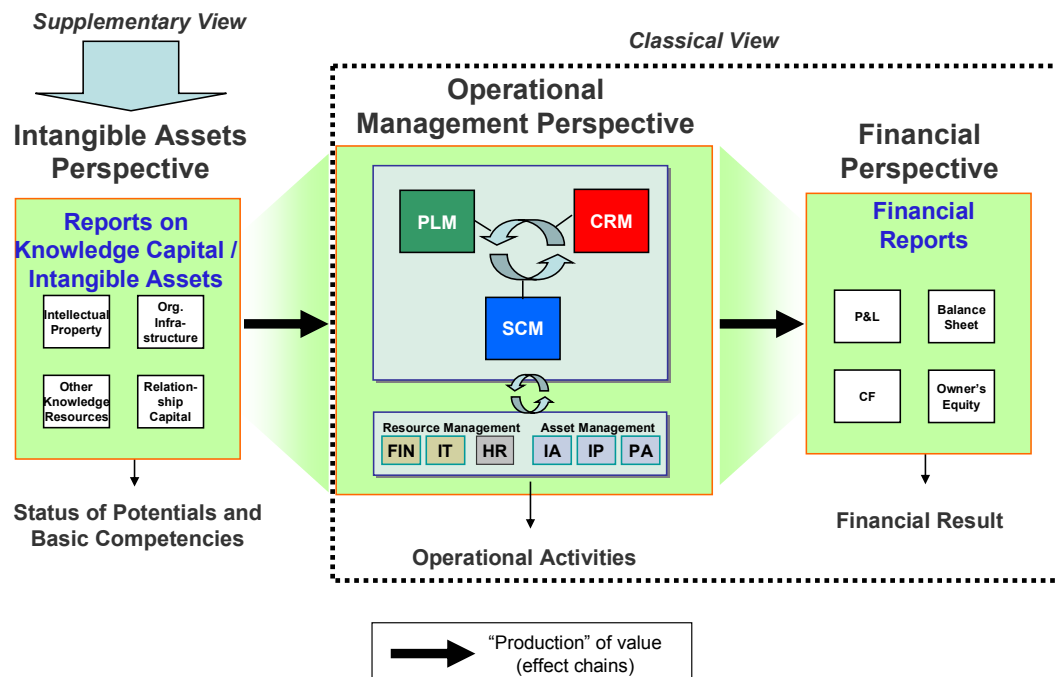


Figure 4: Intangible assets as an additional dimension in enterprise management

An example of a company that subscribed to this philosophy was General Electric under its former CEO Jack Welch. The basic approach was to replace costly physical assets (investments in tangible assets) with existing knowledge assets wherever possible. Under Jack Welch, GE created a management tool that put the company in a position to reduce its dependency on physical assets and to increase its intangible assets, while continuously monitoring the effect on its financial results. The measure used for this was total factor productivity, which is the output per unit of all inputs of work, material, or capital/tangible assets. Detailed data from the Six Sigma quality program was used to do this. For example, GE tracked the source of productivity gains to see whether they came from new physical assets or from new ideas. The goal was to continuously increase total factor productivity and output per existing unit of work resources (human capital) and material and tangible asset resources (physical assets or fixed capital) by means of higher intelligence, i.e. through knowledge capital. While initially the largest share of the productivity improvements was generated by new assets, today more than half comes from the company-wide use of knowledge assets in the form of best practices. By making best practices invented in one business unit available to all business units in the company, process improvements became possible that increased output from existing assets and eliminated the need for new investments to increase capacity or improve productivity. The European branch of the Lighting unit, for example, was able to raise productivity eightfold by applying this concept. While formerly one dollar of investment was needed to create one dollar's worth of capacity,

the same capacity today can be had for only 12.5 cents.¹⁵ GE's strategy here was to exploit existing intangible assets to increase the return on capital of physical assets.

Another approach is to turn existing intangible assets themselves into the basis of the business. GE followed this strategy too by going into the product service business in a big way. For example, the company's aircraft engines unit greatly expanded their maintenance and repair business. This decision was based on the realization that the same knowledge and skills required to build aircraft engines are also needed to maintain and repair them – and that the maintenance and repair business is significantly more profitable than manufacturing. An additional factor was that airlines were glad to outsource this business in order to save costs and concentrate on their core competencies. Today GE earns more money maintaining and repairing aircraft engines than it does selling them.

To successfully implement such a strategy and profitably manage the resulting business, a systematic approach is needed. This starts with analysis of the status quo of the value creation system from an intangible assets perspective, identifying the existing intangibles and describing their role in the complex interdependencies within the company. Strategic planning reviews the business strategy with the goal of better utilizing the existing intangible assets through an improved "value recipe", i.e. through a reconfiguration of the value creation model, to improve profitability, generate growth, improve the capability to create value added in order to improve finally the company's competitiveness and ensure its survival. Deploying appropriate strategy management and performance management tools and the associated management processes puts a company in a position to implement the new strategy and continuously increase its economic success (shareholder value) through the systematic use of intangible assets.

3 Analysis of the Status Quo of the Company's Value Creation System

The purpose of analyzing the status quo of the value creation system is to identify the strategic resources of the company (including the intangible assets) and show what role they play in the value creation system: determining where they function as input, which processes they play a role in (and how they are converted through them), and what the output is. The overall value creation system of the company¹⁶ is analyzed and modeled so that all important resources (including the intangible assets), along with the conversion processes that link them and that create value, are revealed. The following approach developed by the author has proven to be useful in analyzing a company's value creation model:

¹⁵ STEWART (2001), p. 15.

¹⁶ This paper uses the term "company" both to designate an entire business enterprise (such as a corporate group) and to designate a unit that operates largely independently on the basis of a complete business model (such units are often called "business units" in corporate groups). The following concentrates mainly on the second meaning.

3.1 Operations Analysis

Operations analysis, the first step, looks at three dimensions of the operational business:

1. **Customer relationship management:** How are customer relationships established (what is the marketing and sales approach?) and what do they look like from the customer's point of view? What methods and processes do we use to create customer value, set ourselves off from the competition, and make ourselves more attractive for customers? What products and services do we use for this, and for which customers and customer groups? How do we communicate this to our customers, and how do we ensure a positive customer experience? What is the role of our relationship with various agents (retailers, distribution partners, value added resellers, marketing partners)? The task here is a value analysis from the customer's point of view. The goal is to identify both the customer value components and the processes and resources that generate them in areas such as marketing and service, as well as in the downstream areas that create customer value and competitive advantages.
2. **Fulfillment:** How do we ensure that customers receive the product on time and with the right quality? And how do we do this cost-effectively? Here the purpose is to analyze the processes, resources, and methods through which the company fulfils its promises to the customer or consumer (as represented by orders, confirmed purchase orders, or – in retailing – the marketing message) at the lowest possible cost. The production, service, and supply chain processes are analyzed along with the relationships the company has with its customers, suppliers and service partners involved in the output, delivery, and service process.
3. **Research and development:** How do we create value for customers, establish a brand image, and differentiate ourselves from the competition through the product and its features? How is product innovation managed so that it creates new customer value while maintaining profitability? How do we make sure that we are on the right track in product development? What roles are played by partners in the research and development process? Here the purpose is to analyze the procedures with which the company develops or configures its products and services to achieve maximum customer value, image, differentiation, and profitability. The object of the analysis is usually the product development process from development to marketing, including product management, across the entire product life cycle.

Analysis of operations is complemented by analysis of the **key support functions and processes** and the **support infrastructure**:

- Which support functions and processes (such as human resources, purchasing, finance & administration) play a decisive role in our specific value creation system? How are these activities linked to the logic of the operational business (business model)? What are the critical success factors? What support functions and processes are not part of our core competencies in the value creation system? How do we ensure quality and long-term success in the support functions and processes that are part of our core competencies?

- What infrastructure components (such as information systems, logistics and production facilities, a marketing & sales infrastructure in the form of retail stores etc.) play a decisive role in our specific value creation system? How are these infrastructure components linked to the logic of the operational business (business model)? What are the critical success factors? What infrastructure components are not part of our core competencies in the value creation system? How do we ensure quality and long-term success in maintaining or expanding the infrastructure components that are part of our core competencies?

The last step in operations analysis is to identify the type of the primary value creation structure: is it a value chain, a value network, or a value shop?¹⁷ If it is a value network, the different subcomponents may have different structures. For example, fulfillment could be organized as a value chain and R&D as a value shop. Structure analysis can provide useful indicators for resource analysis (since the three structure models have greatly differing resource patterns) and for analysis of the financial returns model (since the three models have greatly differing cost structures).

In operations analysis, the three dimensions of the operational business, the support functions and processes (the support infrastructure) and the primary value creation structure are analyzed both as a whole and with respect to their interlinkages. The result of operations analysis is thus a structured description of the company's current value creation system. It essentially models the value creation system (which is why it could be called also a detailed description of the business model) and provides the basis for the next step, resource analysis.

3.2 Resource Analysis and Creation of a Resource Map

Resource analysis involves a further abstraction for the purpose of showing how value is created by the conversion of resources within the value creation system. All resources are considered, including intangibles.

First, the critical resources in the value creation system are identified. This is typically achieved by answering questions such as: What resources are involved in the different operational processes and support areas, and what is their role? Which resources help to generate the most (customer) value added? What do the conversion processes between these resources look like? The following types of resources are examined:

- Financial capital (including the financing model)
- Physical resources (tangible assets such as physical infrastructure and buildings, production facilities, inventories, and IT systems)

¹⁷ For more on the concept of a value shop and a value chain, see p. 10. A company organized as a value network attempts to create value by bringing customers together – value is created through the contact between customers themselves. Examples include insurance, which spreads risk across large numbers of customers and thus reduces the risk for each individual customer; merchants (including electronic exchanges like eBay), who bring potential sellers and buyers together; and mobile communications companies, who enable their customers to contact each other on the telephone.

- Relationship capital
- Structural / organizational capital
- Human capital

The second step is to analyze the conversion processes between the different resources. The result of both steps is a **resource map** such as the one used in the example of consulting firms A and B (figure 3). Since any level of detail is possible (resulting in a high degree of complexity in some cases), the trick is to keep the resource map simple. Extreme detail and accuracy are not as important as manageability and ease of understanding. In practice, it will usually not be possible to avoid going into detail in the first step, such as when analyzing and recording each operational process. It is important, however, to then reduce the complexity for the next steps through aggregation.

3.3 Analysis of the Profit Generation Capability and Modeling of the Financial Return Model

Operations and resource analysis shows how the company functions in an operational sense to create value for customers, describes how it uses resources, and elucidates the nature of the relationships between the individual resource conversion processes. But if a company creates customer value, this does not automatically mean that it is also able to create financial value (financial returns). This is because customers must be prepared to pay a price that covers costs and also generates a sufficient margin. Furthermore, the company must gain enough such customers to achieve the volume and market share required to earn sufficient financial returns.

This introduces the perspective of financial returns and financial performance, which is based on the insights gained by operations and resource analysis. This approach enables profitability to be understood in a way that traditional financial and cost accounting cannot provide, since it fosters a holistic view by taking intangible assets into account. An analysis of financial return (on investment) that includes intangible assets shows how a company creates financial value from its resources through operational processes and activities, and identifies the true drivers or mechanisms that can be used to control and optimize returns. The main innovation of the approach described here is to link subjective, qualitative, intangible customer value (or with an extended approach of subjective stakeholder value) to objective, quantitative financial values in a holistic analysis of performance. True economic performance, which in the buyer-dominated markets of today consists of both elements (the capability to create subjective customer value and financial returns), can only be made transparent and controllable by this approach.

Following the Balanced Scorecard concept, the analysis of profitability makes an association between the areas below.

First, the two areas that represent the overall performance of the company:

Financial results (returns) and financial levers: Here the financial drivers are identified usually starting off from a financial top performance key figure such as

ROCE, EVA, or ROI. This analysis shows the financial logic of the returns model from the company perspective.

Customer value created and its components: Here the value components of the products are looked at from a subjective customer viewpoint relative to the competition, such as quality, differentiation, attractiveness, image, functionality, after-sales service, price, value of investment. This analysis shows the customer value logic of the returns model, i.e. the value logic of the party, that has to pay (in order to generate revenue).

Then the areas that establish the overall performance of the company:

Performance of operations: Since (actual) financial performance and customer value arise through the operational processes that use existing resources, this area is the key to successful performance management. The processes level is therefore the appropriate starting point for gaining useful information for performance management, because this is where the key levers are located that influence both customer value and financial returns. The performance of the operational process areas customer relationship management, fulfillment, and research and development is measured at two levels. The first level is the overall performance (compound performance) of the process area – that is, the subjective customer value *and* the financial performance are displayed in combination to make the trade-offs between the two areas transparent. This can be accomplished for example with the vector-based performance measurement concept.¹⁸ At the second level, the performance of the operational processes is measured by means of key performance indicators (KPIs) that provide information on the status of the processes, the attainment of particular process performance goals, and so on. The KPIs reflect the critical success factors of the processes and require exact analysis of the value-added activities and subprocesses in each process area. The KPIs can be viewed in what are called cockpits or a Tableau de Bord.¹⁹ The first level shows the compound performance of a given process area, while the KPIs on the second level indicate exactly where action is needed in the detailed processes to improve measures such as customer value, financial performance, or the relationship between the two.

Detailed analysis of the profitability in each process area establishes the connection between the operational processes and the compound performance in each process area, the compound performance consisting of the subjective customer value created and the financial performance. This identifies the “adjusting screws” for fine-tuning compound performance at the detailed process level. By considering the individual process areas together, a fairly clear picture of the economic engine that drives the value creation system will emerge. A simplified example for an automotive company is shown in figure 5. The two process areas R&D and Marketing&Sales (part of customer relationship management) are first analyzed separately and the factors influencing profitability identified, then both are considered together. While in R&D, for example, the decisive success factor to be optimized is the relationship between the productivity of the input resources (R&D costs, human resources/experts employed, FTE not available for other areas, and so on) and the subjective customer value created, in Marketing&Sales it is the ability to convert customer value created in R&D (i.e. product potential) into corresponding sales prices and sales volume. This requires that the

¹⁸ See the following examples and DAUM/BRETSCHER (2004).

¹⁹ See DAUM (2002), pp. 297-339.

customer value created in R&D and production be communicated successfully to customers (so that they can recognize the value before making a purchase decision), since that is what mainly determines the company's ability to charge high prices and sell high volumes. To realize acceptable returns, therefore, two factors are necessary: effective R&D processes (high R&D productivity that creates high customer value through the specific "configuration" of the product while keeping direct costs/opportunity costs low) and effective sales and marketing processes (such as high sales and marketing effectiveness by selling the customer value created at high prices and high volumes). The picture would be complete if the fulfillment area were included, where the focus is on optimizing the relationship between quality and costs, for example (see the following case study of Toyota).

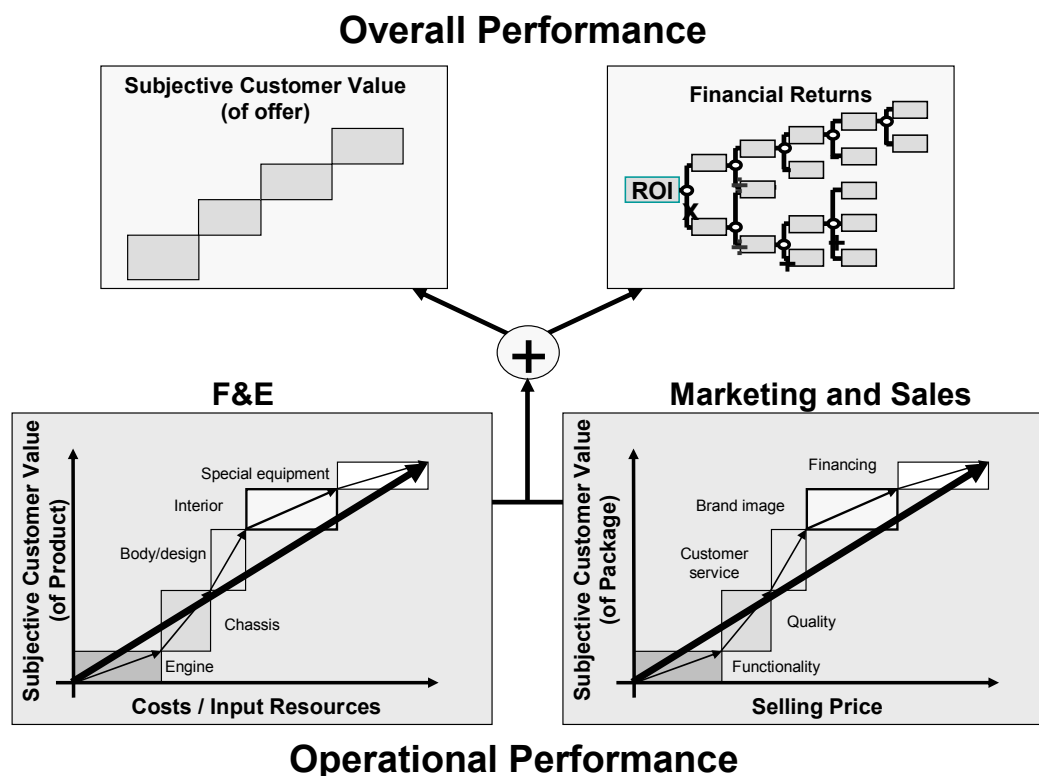


Figure 5: Analysis of profitability for process area R&D and customer relationship management

Status of resources and performance of support processes: The last step is to transform the knowledge gained from resource analysis into something that can be used by performance management. The goal is to identify the influence of the different resources on the company's financial returns, which requires knowledge of how the resources are linked to the operational processes. Resource analysis already showed which resources are used with which processes. Based on the knowledge obtained from detailed analysis of the profitability of the process areas, the influence of the resources in each subprocess on the total performance of a given process area can be assessed and given a relative weighting. At the subprocess level, the knowledge regarding the resource conversion processes can be refined and the resource map updated. By weighting the subprocesses in each process area, or the process area itself from the overall perspective of the business model, it is possible to aggregate the resource maps

for each subprocess into a resource map for each process area, or to aggregate the resource maps for each process area into a global resource map. The aggregated resource map then provides valuable guidance for prioritizing the resources or the associated support processes. As with the operational processes, performance measurement in the resource area can take place in two steps. First, suitable KPIs are used to determine the overall status of each resource with respect to customer value (in this case, the customers are the internal processes or process areas that use resources) and the financial performance/costs as well as the status of the associated support (sub-) processes.

Once the returns model has been set up, it can then form the basis for defining an appropriate performance measurement system, for example in the form of a multidimensional and multilevel Performance Balanced Scorecard or as a Tableau de Bord that successfully manages and optimizes the overall performance.

4 Intangible Assets–Based Strategic Potential Analysis. Creating the Strategy Map

Strategic potential analysis takes place in two complementary ways. First, a determination is made of what potential is required to reach the company's targets (analysis of strategic readiness), and second, what potentials the company has that are currently relatively idle but could be used for additional growth or to generate additional customer value and thus financial returns (analysis of hidden value creation potential).

Analysis of strategic readiness starts by defining the financial targets (returns) and the targets from the customer perspective (customer value that must be created to enable financial targets to be attained). Then the operational process areas are examined with regard to changes necessary to reach the customer value targets and finally the financial returns targets. Next, the support areas or the resources and potentials are examined to see whether they are currently in a position to enable the required changes in the operational process areas. If that is not the case, programs and initiatives are started to rectify the situation. For example, a new strategy established with the objective of meeting financial and customer targets within the next two to five years may place high demands on particular task profiles (jobs or job families) in customer management. Development targets for these job families are derived for the corresponding support area (personnel development) that must be met either through new hires or internal training. The same applies to other resource areas such as financing, IT infrastructure, production infrastructure, supplier networks, and dealer networks. The financial and customer value targets are therefore broken down into the operational process and support areas from a global perspective, and the relevant (sub-) targets and the initiatives required to realize them are defined for each level. The result is what is called a strategy map, which describes the strategy in all aspects required for successful management of the strategy – including intangible resources and potentials (intangible assets). Strategy maps represent the key value creation areas for the entire company and the degree of their strategic readiness as well as the status of the corresponding initiatives and development programs. Figure 6 shows a strategy map based on

KAPLAN/NORTON's concept.²⁰ This high-level strategy map is then broken down into detailed strategy maps for each area.

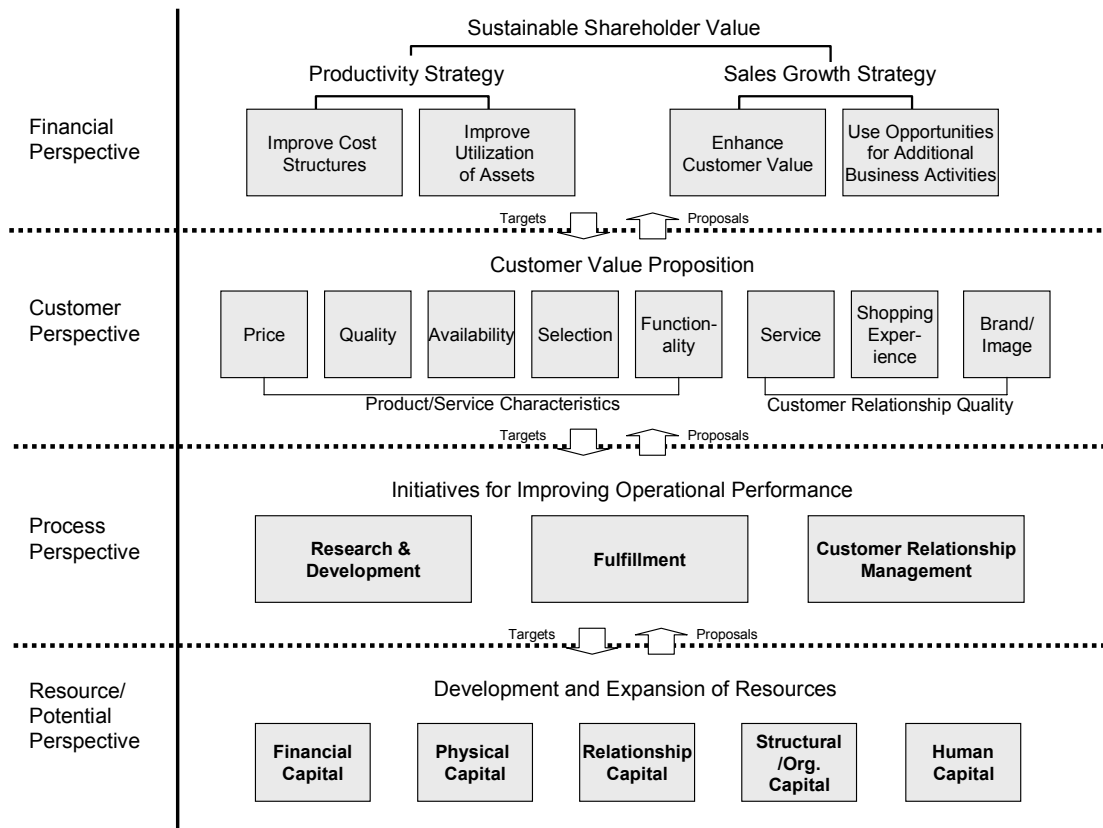


Figure 6: Strategy map for identifying development targets for all levels in the value creation system – including intangible resources and potential (intangible assets)²¹

Analysis of hidden value creation potentials starts by analyzing existing potentials (including intangible resources - intangible assets) with the goal of identifying potentials that have not been fully utilized up to now or whose value creation potential can be enhanced by modifying the business strategy. An example is the case of General Electric described above, which discovered that the existing human and structural capital in its aircraft engines unit could be applied to highly profitable maintenance services that actually create more value for the company than its traditional core business. The automotive industry, to take another example, might consider what additional value it could create for customers and stockholders through improved utilization of dealer and supplier networks by means of a strategy that converts the traditional value chain structure into a value network, better enabling intangible assets to be multiplied. Intangible resources usually harbor considerable hidden potential, since companies are not used to “inventorying” their intangibles and analyzing their potential benefits as they do with their physical capital. The second type of strategic potential analysis therefore leads to the creation of a strategy map or modifying existing maps.

²⁰ Kaplan/Norton, 2004.

²¹ Based on KAPLAN/NORTON (2004), p. 3.

How can this classification of the analysis of a value creation system be applied to an automotive company to gain useful information for the design of a management system that helps guide the company's value creation system towards more value creation, including intangible assets? This will now be discussed using the example of Toyota.

5 The Example of Toyota²²

Toyota Motor Corporation, with 11 production companies in Japan and 51 overseas (mainly in North America and Europe), net revenues of 17,295 billion yen (\$160 billion), 264,000 employees worldwide as of March 31, 2004, and dealers in more than 140 countries, is one of the world's most successful automakers. In its annual ranking of the best automotive companies in the world, the US magazine *Fortune* in October 2000 placed Toyota at number one among a total of fourteen manufacturers. Looking at the situation in the North American market, it is clear what forces Toyota has released during the past twenty years since the company set up production facilities there, and what a threat it represents to the American "Big Three" of General Motors, Ford, and Chrysler. The market share of these traditional US manufacturers has deteriorated continuously, with an accelerating decline over the past five to seven years. At the same time, Toyota has been able to increase its market share relentlessly. From 1997 to 2002 alone, for example, the Big Three gave up ten percent of their market share to foreign competitors such as Toyota. In the opinion of *Business Week*,²³ Toyota was poised at the time of the publication of the article to overtake Chrysler as the third-largest manufacturer in the United States based on market share. If Toyota keeps up this growth, *Business Week* expected it to even surpass Ford and become the world's second-largest automobile manufacturer by the middle of the decade. The next target would then be the number one spot, which is currently held by General Motors with a worldwide market share of 15%. Toyota's president and CEO Cho did in fact intend to increase the company's worldwide market share from currently 10% to 15% by 2010. *Business Week* therefore justifiably asked, "Can Anything Stop Toyota?" (Bremner and Dawson, 2003). The signs that the traditionally dominant US manufacturers will be able to defend their market share are not encouraging. For instance, Toyota was able to announce record results for the fiscal year ending March 31, 2004. Despite a depressed overall market, its worldwide sales jumped by 9.9%, net revenues by 11.6%, and operating income by 31.1%, while return on equity rose to a record high of 15.2% (previous year: 10.4%). These results are by no means exceptional for the company. Toyota has consistently increased sales, productivity, and profitability for years, even decades. For instance, over the past five years the operating income in its foreign subsidiaries increased by almost 300% (see <http://www.toyota.co.jp/en/ir/>). In the face of these developments, the American journalist and expert on the automotive industry, Micheline Maynard, predicts in her book *The End of Detroit*²⁴ that the dominance of

²² The following account of Toyota Operations is based on the indicated literature and attempts to describe Toyota's operational processes and support areas as accurately as possible. The subsequent analyses of resources, profitability, and strategic potential were performed by the author on this basis without additional research into Toyota Corporation. These analyses are therefore fictitious in nature and are only intended to serve as an example.

²³ BREMNER/DAWSON (2003), p. 117.

²⁴ MAYARD (2003), p. 229.

American companies in the automotive industry is coming to an end and that at least one of the Big Three will have disappeared from the scene by the end of the decade.

Why is Toyota so successful?

In Micheline Maynard's view, the Big Three's troubles have come about mainly because they no longer understand customer needs (as Toyota does) and because they focus too much on short-term financial results. It is indeed possible to see this development as one of losing the understanding, sensitivity, or "nose" for intangible customer values and how they arise in the value creation system, and instead managing from purely a financial perspective even though financial results are simply a delayed reflection of how customers value the product. US manufacturers are no longer able to maintain a balance between customer value and financial returns, which endangers their competitiveness and long-term survival. Maynard sees a clear symbol of this development in the fact that US automakers, with very few exceptions, have traditionally been managed by finance people while their successful competitors from Japan and Europe are led by engineers who understand cars inside and out (an exception is Dieter Zetsche of Chrysler, who was trained as an engineer but, in her view, is having a difficult time restructuring the company).²⁵

Another indication that Toyota is in a position to generate more customer value and offer more attractive products than its competitors can be found in the rebate battle raging in the U.S. Toyota has been able to get by with much lower rebates while simultaneously grabbing market share from US manufacturers in the very segment in which they thought they still had an advantage: the popular Sport Utility Vehicles (SUVs). In the fall of 2003, the average rebate on each Toyota sold was only \$647, while General Motors needed an incentive of \$3812 and Ford \$3665²⁶ to move each of its cars out of the showroom.

As *Business Week* summarizes it, automakers such as General Motors and Ford may still post significantly higher sales and have a larger market share than Toyota, and Nissan is still somewhat more profitable than Toyota, at least in North America. Both Nissan and Honda have highly flexible manufacturing processes. Yet no automobile manufacturer combines so many strengths in so many relevant areas as Toyota. The Japanese giant maintains high standards of quality, understands what customers want, has extremely efficient production processes, is cost-effective yet flexible, and boasts the highest productivity per employee in the automotive industry (see table 1).

Year	<i>GM</i>	<i>Ford</i>	<i>Renault</i>	<i>Volkswagen</i>	<i>Toyota</i>	<i>Nissan</i>	<i>Honda</i>
1998	9.05	9.7	14.05	15.13	20.73	17.89	14.67
1997	9.15	10.3 3	11.65	9.99	24.59	16.07	21.02

²⁵ It is true that Fujio Cho, president and CEO of Toyota, is not an engineer, having been educated in law. But he sees himself as an engineer. For example, when Cho was manager of the first US Toyota plant (in Georgetown, Kentucky), he walked down the production line every day and spoke with workers for hours, and was personally involved with optimizing production processes and product quality.

²⁶ See BREMNER/DAWSON (2003), p. 118.

1996	8.51	10.3 8	10.81	10.63	24.53	20.22	13.67
1995	7.97	15.7 2	10.85	8.87	22.95	15.47	16.32
1994	7.94	11.9 2	11.62	9.1	22.95	13.91	16.32
1993	7.55	11.7 1	10.8	8.3	31.29	15.54	17.24

Table 1: Number of units per year and employee (VAGHEFI 2001, p. 3)

Toyota's formula for success, then, is that it is able to combine a focus on customer value with a focus on resource efficiency and flexibility. The cornerstone of this formula is the Toyota Production System (TPS), a form of work organization invented and perfected by Toyota over the decades that exploits the intelligence and dedication of its plant employees as fully as possible. Its key principle is that what employees do should not be solely dictated by the technical process or the logic of the production line, as is the case with the usual "push" systems. Instead, the Toyota Production System is designed as a "pull" system that encourages employees to use their intelligence and initiative so that the factory produces exactly what customers are asking for, while maintaining high quality and avoiding waste in any form. This is symbolized by the ability of any worker to stop the production line in case of problems or defects.

Teruyuki Minoura, Senior Managing Director and Chief Officer of the Business Development Group & Global Purchasing, Toyota Motor Corporation, explained this during a talk at the Automotive Parts System Solution Fair in Tokyo on June 18, 2003: "Under a 'push' system, there is little opportunity for workers to gain wisdom because they just produce according to the instructions they are given. In contrast, a 'pull' system asks the worker to use his or her head to come up with a manufacturing process where he or she alone must decide what needs to be made and how quickly it needs to be made. An environment where people have to think brings with it wisdom, and this wisdom brings with it *kaizen* (continuous improvement). [...] Perhaps the greatest strength of the Toyota Production System is the way it develops people. [...] Developing people is the starting point for *monozukuri* (making things) at Toyota."²⁷

How does the Toyota Production System work, and what are its features?

5.1 The Toyota Production System (TPS)

Toyota's goal is to offer customers a wide range of models and high quality at low prices. The customer relationship focus is therefore on providing value for money. After World War II, Toyota developed a unique fulfillment system called the Toyota Production System (TPS) and has continuously refined it ever since. TPS enables Toyota to manufacture cars to individual customer specifications at significantly lower costs than other manufacturers, giving it the highest profit margin of any major

²⁷ Toyota Public Affairs Division (2003), pp. 1-2.

automaker. At the same time, TPS can react more flexibly to changing demand. Although it is still mass production, the entire process from the manufacture of the chassis to the production of all components to final assembly is driven by the individual sales order, and does not involve expensive warehousing or cause excessive scrap. Avoiding *muda* (waste) is a basic principal of TPS, and Toyota has devised a number of methods to achieve it that are today regarded as “best practices” in the automotive industry.²⁸

One of these methods is called *takt time*, which defines a uniform processing rate at each station in the production process. It corresponds to the rate at which finished cars come off the assembly line, i.e. are ordered by customers, such as one car every 60 seconds (the takt time can vary from plant to plant). Although up to eight different models can be produced in a single run, gradual improvements over many years have enabled Toyota to reduce the setup times needed for each model across all manufacturing levels to such an extent that the remaining overhead is actually less than that of manufacturers who produce only in batch runs of a single model. This allows Toyota meet individual customer specifications without the high costs normally associated with continually switching over to different models.

To enable a uniform takt time across the entire plant and including the suppliers, it was necessary to standardize all required work down to the last detail. Thoroughgoing standardization of work steps is therefore the second element of TPS.

The standardization of all processes in the plant also makes it possible for any worker to notice immediately when something is amiss, which is then signaled by the *andon* electric light boards visible throughout the factory. Problems are always fixed directly on the line and not by repairing the finished products afterwards. If it is not possible to eliminate the problem during the regular takt time, the workers themselves can stop the production line, and even stop the entire factory if necessary. This ensures high quality and makes expensive repairs unnecessary. The term used by Toyota for this process of errors recognition and correction is *jidoka*. It represents the third element of TPS.

The core element of TPS is *kanban* or “just-in-time”. When new material is required by a given process step, it sends a signal to the previous step indicating which component is needed and the exact version required. Input materials and components are produced only in quantities sufficient to process sales orders - which increases efficiency and eliminates waste. Materials management is therefore an inherent part of the process rather than a separate control system.

An additional element of TPS is *heijunka* or production leveling, which smoothes out the varying capacity requirements of the process steps (processing stations) that arise when different versions are produced that require different capacities at a given processing station. Without production leveling, each processing station would have to have enough capacity to be able to handle maximum production peaks in order to maintain the throughput time of the overall production process. Because of interactions between the different processes and the resulting “see-saw” effects, a traditional production process would need to have high reserve capacities and therefore costs

²⁸ On the following, see OHNO (1988), pp. 17-74; JOHNSON/BRÖHMS (2000), pp. 75-113.

would also be high. Toyota avoids this by means of production leveling, which spreads the versions manufactured on a given day or during a given shift evenly across the production process. For example, if a processing station needs 65 seconds for a car with air conditioning and 40 seconds for one without, it does not need to maintain a constant capacity of 65 seconds. Instead, the capacity is leveled out by alternating the versions passing through the station. This method enables the processing stations to handle short-term peaks. Since these peaks always occur only temporarily for one model, the extra time needed for that model can be compensated during the takt time of the models following it that require less processing time. The overall capacity requirement for the processing station is therefore the average processing time of all models passing through it, which is far less than the maximum value of 65 seconds.

With TPS, Toyota has moved in a different direction from its U.S. and European competitors (although they have started to implement elements of TPS, as are other Japanese manufacturers such as Honda or Nissan). Toyota has been able to combine the wide product range and quality demanded by the postwar buyer's market with very high levels of efficiency and flexibility. This has kept Toyota in an unbroken position as industry leader in profitability and productivity. The father of TPS, Taiichi Ohno, writes: "Modern society's diverse wants and values are clearly seen in the variety of cars. In fact, it is certainly this diversity that has reduced the effectiveness of mass production in the automobile industry. In adapting to this diversity, the Toyota production system has been much more efficient than the Ford-style mass-production system developed in America. Toyota's production system was originally conceived to produce small quantities of many types for the Japanese environment [at a time when the demand for cars in postwar Japan was low – author's note]. Consequently, on this foundation it evolved into a production system that can meet the challenge of diversification. While the traditional planned mass-production system does not respond easily to change, the Toyota production system is very elastic and can take the difficult conditions imposed by diverse market demands and digest them. The Toyota system has the flexibility to do this. After the oil crisis [of the 1970s], people started paying attention to the Toyota production system. I would like to make clear that the reasons lie in the system's unsurpassed flexibility in adapting to changing conditions. This capacity is the source of its strength even in a low-growth period when quantity does not increase [since even then Toyota is able to maintain high margins and good profitability]." ²⁹

The Toyota model attracted worldwide interest following the oil crisis of the 1970s, and in Japan itself has been the focus of increased attention since the 1990s. Nearly all automakers today apply the best practices of the Toyota Production System and are hot on Toyota's heels in terms of quality. But Toyota is still confident that only a few outsiders really understand TPS, since imitators usually only copy some of its individual elements and tools. ³⁰

²⁹ OHNO (1988), S. 37-38.

³⁰ The Toyota model consists of far more than just these elements alone. There are many elements that must be combined in just the right way, especially intangible resources such as human capital and the supplier and dealer networks. As Minoura puts it, "Simply introducing *kanban* cards or *andon* boards doesn't mean you've implemented the Toyota Production System, for they remain nothing more than mere tools." (TOYOTA PUBLIC AFFAIRS DIVISION (2003), p. 1)

Nevertheless, the company is watching the competition closely – particularly in the area of quality. This is because quality is one of the key factors in Toyota's worldwide success over the past several decades. Minoura took up this point in his speech: "Overseas carmakers and parts suppliers have come fairly close to reaching Japanese quality levels. This means that we've got to think really hard about what we have to do to maintain our preeminence in the area of quality."³¹ But Toyota is under no delusion that the edge it currently enjoys in other aspects is not permanent, either. The only way to maintain its lead is to become better in all areas. To make this possible, Toyota has launched a number of projects aimed at improvements in the following areas:

Flexibility: The company is currently working on an integrated, flexible, global manufacturing system that encompasses all its plants worldwide. In addition to serving the local market, each plant should also be equipped to handle short-term peaks in other markets. This not only makes it possible to react quicker and better to surges in demand, it also increases capacity utilization and helps improve the utilization of existing investments or avoid new investment while still increasing capacity. For example, Toyota estimates that by tapping its South African factory to meet demand in Europe, it will save the \$1 billion in investment needed to build a new plant.³²

Efficiency/productivity: With a program called "Construction of Cost Competitiveness for the 21st Century" (CCC21), president and CEO Cho wants to reduce costs by 30% for all key components of new models. While past improvements were achieved in a relatively haphazard way as part of *kaizen*, the goal is now to identify and implement cost saving potentials systematically based on a challenging goal. This requires the commitment of both employees and suppliers. For example, Toyota engineers have closely examined the grab handles mounted above the door inside most cars. Working with suppliers, they managed to reduce the number of parts in these handles from 34 to five. As a result, they were able to cut procurement costs by 40% and decrease the time needed for installation by 75% to only three seconds. In addition, special *kaizen* teams of workers look for ways to save time and money in the production process. One result is a new brace system for holding the body during welding that is only half as expensive as normal systems and reduces the cost of refitting a production line to build a different car by 75%. These efficiency measures enabled Toyota to save \$2.6 billion in production costs in fiscal year 2003. Another \$2 billion was saved in 2004, and the initiative will be continued into fiscal year 2005.

Quality: To improve quality, Toyota now wants to concentrate more on processes that lead to product defects. Minoura: "When we talk about defects in our factories, we are talking about defective processes. If there's a defective process, it's going to turn out defective products. Components move from supplier to supplier in a flow, and unless an excellent control system is in place, it's impossible to prevent defects from occurring. Establishing such a control system is easiest when the supply chain is simple. And that is something for which top management should take responsibility. Nevertheless, human beings are the ones who actually build quality into a product."³³ To maintain its high quality standards even as the company grows, Toyota is now working with its 300

³¹ Toyota Public Affairs Division (2003), p. 3.

³² BRENNER/DAWSON (2003), p. 117

³³ Toyota Public Affairs Division (2003), p. 4

components suppliers on improving efficiency and simplifying the supply chain. It is also investing heavily in its human capital, such as through intensive training of new employees in the methods of the Toyota Production System and the Toyota way of thinking.

Customer benefits and product attractiveness: Toyota sees a growing need to better respond to customer demands in product development. In particular, it wants to incorporate input from overseas markets in product development at an early stage. To achieve this goal, a new development process has been implemented that is coordinated by the Head Office Technical Center in Japan but gives more weight to R&D facilities in Europe and the United States. This reflects the company's recognition that in the past, product development and especially the design of its cars had been too geared to Japanese tastes. Today, design teams in California, southern France, and Japan compete among themselves for new projects. Toyota also recognized that feedback from customers must quickly be fed into the development process, so it surveys customers of new models during the first three months after purchase. The dealer network is now being used to collect feedback as well. The dealers that Toyota has identified as good "early warning indicators" are hooked up to the Toyota data network, and when a customer mentions anything about a product that the dealer did not know, the dealer feeds this information back into the Toyota network on the very same day.

5.2 Analysis of the Toyota Value Creation System

Let us now analyze the Toyota value creation system based on the above criteria.

Operations Analysis

Analysis of the operational process areas:

Customer relationship: As discussed, operations analysis begins by investigating how the company creates customer value, differentiates itself against the competition, and increases its attractiveness to potential customers, as well as how this subjective customer experience is organized. Toyota's traditional recipe is to provide "value for money" by offering a wide range of high-quality products at low prices. Defining customer value is the starting point for creating competitive advantages. The Toyota definition clearly points to the fulfillment area as that part of operations where these advantages should be established. In customer relationship management itself, however, the Toyota value creation system does not differ significantly from that of its competitors (even considering recently launched initiatives aimed at improving the utilization of dealer networks, for example).

Fulfillment: This is the focus of the Toyota model. In contrast to the traditional U.S. production model (which served as a model for many non-U.S. manufacturers following World War II), the specific design of the fulfillment system, the Toyota Production System, enables Toyota to combine a wide model range with quality and efficiency. This is the basis of the company's competitive advantage and its ability to create above-average customer value *and* financial value. The basic principle of TPS is the "pull" system. Instead of controlling the work steps and processes with a system separate from the production process as is the case in a "push" system, the quantities and models to be

produced are defined by market demand starting from the end of the production process and working backwards from there. Using methods such as *kanban*, *takt time*, and *production leveling*, output is “pulled” from the earlier process rather than being “pushed” from one process to the next. This allows Toyota to react flexibly to fluctuations in demand, avoid overproduction, and keep the production system efficient and cost-effective despite a wide variety of models and versions. The focus on quality (customer value) ensures a high level of perceived quality and thereby increases the attractiveness of the product for potential buyers. For the pull system to work, however, it is necessary to make use of the intelligence and commitment of the workers as fully as possible, and involve their creativity in the production process rather than simply giving them instructions. Moreover, suppliers must be brought into the process as well and put into a position to apply the principles of TPS themselves. This points to the critical intangible resources (supplier networks, employees) that play a critical part in creating customer value and financial returns for Toyota.

Research and development: In the past, R&D did not have a special role in the Toyota value creation system. Recent initiatives to improve Toyota’s R&D processes by better taking account of customer demands from outside of Japan can be understood as an initial defensive reaction to the globalization of the company’s activities, since it had realized that too many of its products were being developed primarily for Japanese tastes.³⁴ Since other carmakers are starting to catch up with Toyota in the fulfillment area (in quality, for example), the company is attempting to implement improvements in other areas such as R&D. This includes a system that supports systematic responses to customer feedback. If the feedback concerns the design, the design centers react within a maximum of 10 days.

Key support functions and processes:

Employee development: Human capital has always been an important resource at Toyota. Toyota’s pull system is based on the personal decisions of line workers and consequently on their expertise, sense of personal responsibility, and commitment (such as to stop the production line when a problem arises – Taiichi Ohno, the architect of TPS, calls this “autonomation” or “automation with a human touch”³⁵). Toyota goes to great lengths to educate new workers in the “Toyota Way” and train them step by step for their jobs. This is because the Toyota Way does not simply consist in following instructions but requires that each worker have a high level of knowledge about the entire production process and not just about his or her particular task. Since the company wants to continue to grow globally, a critical support function has been identified that implements this way of developing people in the Toyota Way in markets outside of Japan, enabling them to “inherit” Toyota DNA with the goal of multiplying the knowledge which previously existed only locally in the home market. For this

³⁴ When president and CEO Cho visited Germany in 1994, he was asked why Toyotas are so poorly styled. His answer was that too many Toyotas were designed with Japanese consumers in mind and then exported. Some worked, others flopped. Toyota has now established design centres in the U.S. and Europe.

³⁵ OHNO (1988), p. 121.

purpose, the Toyota Institute was founded in Japan in January, 2002. The institute educates managers from all over the world in the Toyota Way.

Management of the supplier network: Takt time in fulfillment can only function if the suppliers work according to the same principle as Toyota itself and are in a position to deliver their components to the production line in the right version, at the right time, and in the right quality. Toyota, the company that invented the just-in-time principle, has thus gone further than other automakers in collaboration with suppliers. It has a strong interest in convincing its component suppliers to implement TPS themselves, and wants to help them do so. Only in this way will it be possible for Toyota to reach its goals over the long term. The need to pace its fulfillment system (which the suppliers are of course a part) in an efficient and effective manner based on customer demands requires partner-like relationships with suppliers. The role of suppliers and carmakers becomes blurred when both are oriented towards the consumer, which is the basic principle of the Toyota system. Nevertheless, mechanisms are needed for informing suppliers about changes in customer requirements and in the Toyota system or in the corresponding Toyota goals, and how the suppliers are integrated into the Toyota initiatives. The effectiveness of supplier relationship management (SRM) is consequently an important success factor in Toyota's value creation system.

Management of the dealer network: Management of the dealer network through which Toyota sells its products, delivers them to consumers, and provides after-sales service formerly did not play a significant role compared with other car companies. Only recently have attempts been made, as described above, to utilize dealers for collecting customer feedback and forwarding it to development.

Infrastructure: The logistics and production infrastructure – within factories but also outside them (in association with the supplier network) – represents what is probably Toyota's most important infrastructure component. An additional factor is the information system infrastructure, which will gain importance as Toyota networks its plants worldwide, as well as the dealer network already mentioned.

Structure analysis of operations:

The predominant structure of the Toyota value creation system is that of a value chain, which is characterized by a high proportion of structural capital and where the focus is on converting resource input into customer value in a mass production environment.³⁶

Resource analysis:

Using operations analysis, the key resources in the Toyota value creation system can now be identified:

Human capital: Workers, managers and other employees who are fully conversant with the methods of TPS and who understand the Toyota Way.

³⁶ For a definition of the value chain concept, see p. 137.

Structural and organizational capital: TPS processes and their associated concepts, methods, and documentation (such as descriptions of standards), methods that allow know-how to be transferred to new locations in different countries and cultures, methods and processes that organize cooperation with suppliers and dealers, and so on.

Relationship capital: The existing customer base and the brand, relationships with suppliers (supplier network), relationships with dealers (dealer network).

Physical resources: Buildings, machines, and other plant facilities; research and development centers; inventories of raw materials and semfinished products, and so on.

Financial capital: Liquidity, the ability to obtain loans or issue bonds (credit rating, creditor image) or to issue new shares of stock (shareholder image).

If the Toyota value creation system is compared with that of other carmakers, it can be seen that its most important resource elements are human capital, structural capital (mainly in the form of the Toyota Production System), and the supplier network. The process of converting resources, which is how value creation at Toyota takes place, can be represented as follows (see figure 7):

The main line, which is in the fulfillment area, starts with the human capital in the plants: the workers, who apply their knowledge and intelligence to continuously achieve process improvements (*kaizen*) in TPS. In so doing, they convert their human capital into structural capital. Toyota also utilizes its relationships with suppliers to improve and strengthen TPS, since the suppliers are part of TPS as well. Supplier relationships are therefore converted into structural capital in the form of a better TPS. This in turn improves the capacity utilization of physical resources and leads to lower costs and less tied-up capital, which boosts financial returns and thus increases the amount of financial capital available.

A secondary line, which was opened by Toyota's new approach to R&D, also starts with human capital: the researchers, developers, and designers in different cultural regions (Japan, Europe, and the United States) who understand their local markets. Networked across the global R&D processes (structural capital) and supported by relatively little physical capital (buildings and a few computers), these people work to develop attractive products that further expand sales and market share and consequently increase financial returns and financial capital.

Similarly, a third line starts with the human capital in sales and marketing or with dealer management that, underpinned by structural capital in the form of dealer management processes and the dealer network and marketing processes, strengthen the customer base and the image of the company with the goal of increasing the attractiveness of Toyota products for both existing and potential new customers.

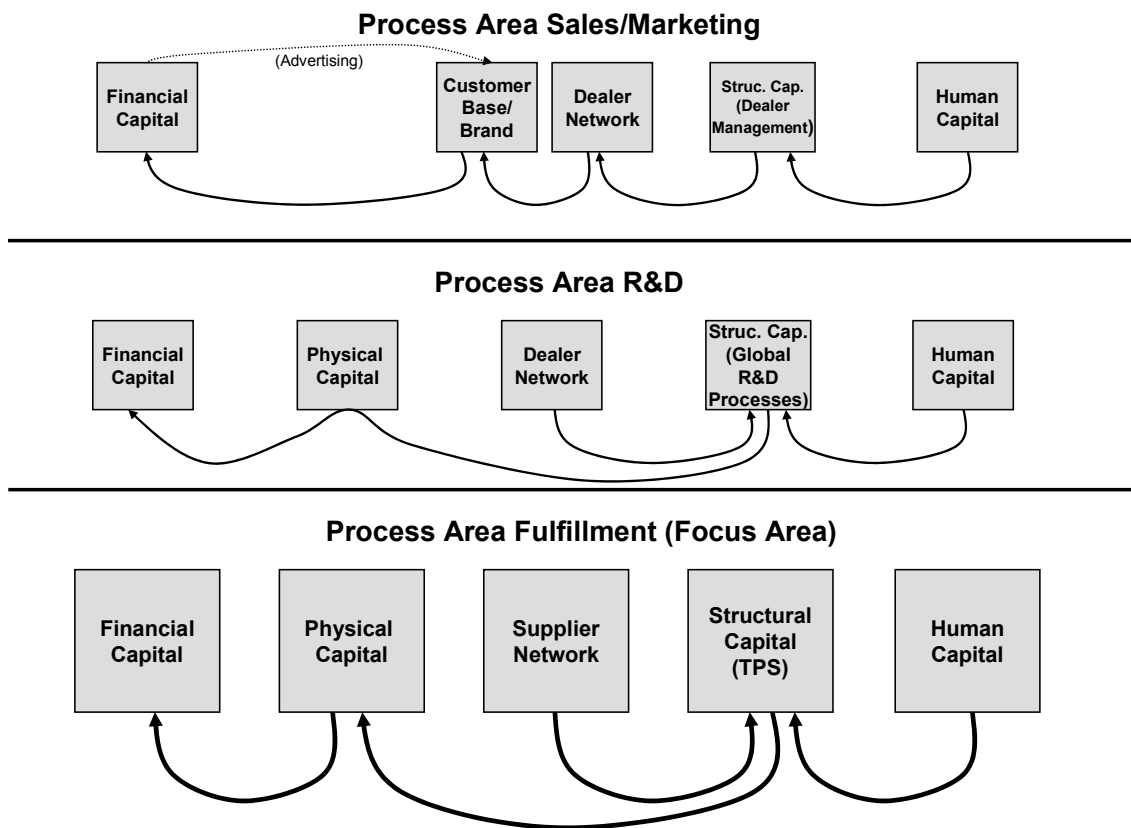


Figure 7: Possible version of a resource map for Toyota

Analyzing the Profit Generation Capability and Modeling the Financial Return Model

A key factor in Toyota's profit generation capability is its ability to create customer value at low costs. Our analysis therefore begins with the components that constitute the value of Toyota products from the customer's point of view. These are components such as the company's image (brand name), the quality of its marketing and customer service (determined mainly by dealers and servicing), the quality of its products (determined by the fulfillment processes), and the functionality and design of its products (determined by the R&D processes). It should now be possible to analyze these components from a top-down perspective as follows:

- What costs does Toyota incur in "manufacturing" these components?
- What price would a customer be prepared to pay for the final product, and what share do the individual components contribute to this price?

This establishes a connection between customer value and financial returns. As mentioned above, this "combined performance" can be represented by vector-based performance measurement,³⁷ which enables optimization analysis from both perspectives and demonstrates the influence of measures on the respective other dimension. This would involve questions such as: What measures could increase the

³⁷ Daum/Bretscher (2004).

customer value of components that are particularly important to customers or that have a strong effect on the readiness of customers to pay a higher price? What is the estimated strength of this influence? What measures could be undertaken to lower the production costs for these customer value components without affecting how customers perceive their value? How much lower could the costs be?

At the next level, this approach is broken down into the three main process areas of customer relationship management, fulfillment, and R&D. It is here in the operational processes that the overall performance is generated (both customer value and financial performance) as shown in figure 8. This level is therefore where performance management must begin. Likewise, the optimization measures that were defined at the first level must be broken down onto this level (by means of qualitative requirement profiles and quantitative target figures, for example) and implemented through suitable measures. It is necessary to manage and optimize the relationships and trade offs between product quality and efficiency of the production process (throughput time, costs) in fulfillment, in R&D the theoretical customer value attributed to the product by customers and the corresponding product component costs, and in sales and marketing achievable prices (avoiding rebates) and marketing support (i.e. through advertisement). To achieve this, the processes in the different areas must be actively managed with regard to the overall performance of the respective process area. By analyzing the sensitivities of the process KPIs against the overall performance of a process area, it is possible to determine exactly where management and optimization needs to start.

At the level of resources, finally, the analysis investigates which resources affect overall performance, how they affect it, and which processes are involved. The intent here is to monitor and optimize the productivity of key value-adding resources in the company's value creation system. At Toyota, the key value-adding process area is fulfillment. The key value-adding resources in this area are human capital, structural capital in the form of processes (the methods and concepts of TPS), physical capital in the form of machines and other plant equipment, and the supplier network. The management and optimization of resource productivity again involves two dimensions. The first dimension is that of the qualitative requirements profile as seen from the perspective of the receiving process (such as the capabilities, knowledge, and proficiency of production workers), while the second dimension is that of the costs of the resource or the costs of efforts to develop the resource towards a given requirements profile. Performance in the area of resources and the corresponding support processes is therefore represented at two levels: the overall performance of the resource/support area (a combination of qualitative standards fulfillment and quantitative financial effects) and the performance of the associated support processes, which are monitored with process KPIs. The dimension of the financial effects of the resource view can also represent the productivity of particular resources from a high-level view. A classic example is the number of employees in relation to sales or profit (defined as operating income or return on capital). If we compare Toyota against the competition, we see that its figures look considerably better. Each additional General Motors employee, for example, creates sales growth of 0.09%, but for Toyota the figure is 0.35% – almost four times as much. Another revealing statistic is the sustainability of productivity improvements achieved through investments in key resources. When U.S. carmakers invest in physical capital (production facilities), almost no effect on sales can be detected in the second year after the investment. For Toyota, however, each percent

increase in investment generates 0.51% higher sales in the second year. This can be attributed to the superior ability of the Toyota Production System to generate value from physical capital.³⁸ Summarizing the aspects of all three levels, figure 8 shows a possible returns model for Toyota. This is the starting point for the design of a performance measurement system incorporating all relevant aspects and resources – including intangibles – for managing an automobile manufacturer like Toyota from the perspective of customer value and return on investment.

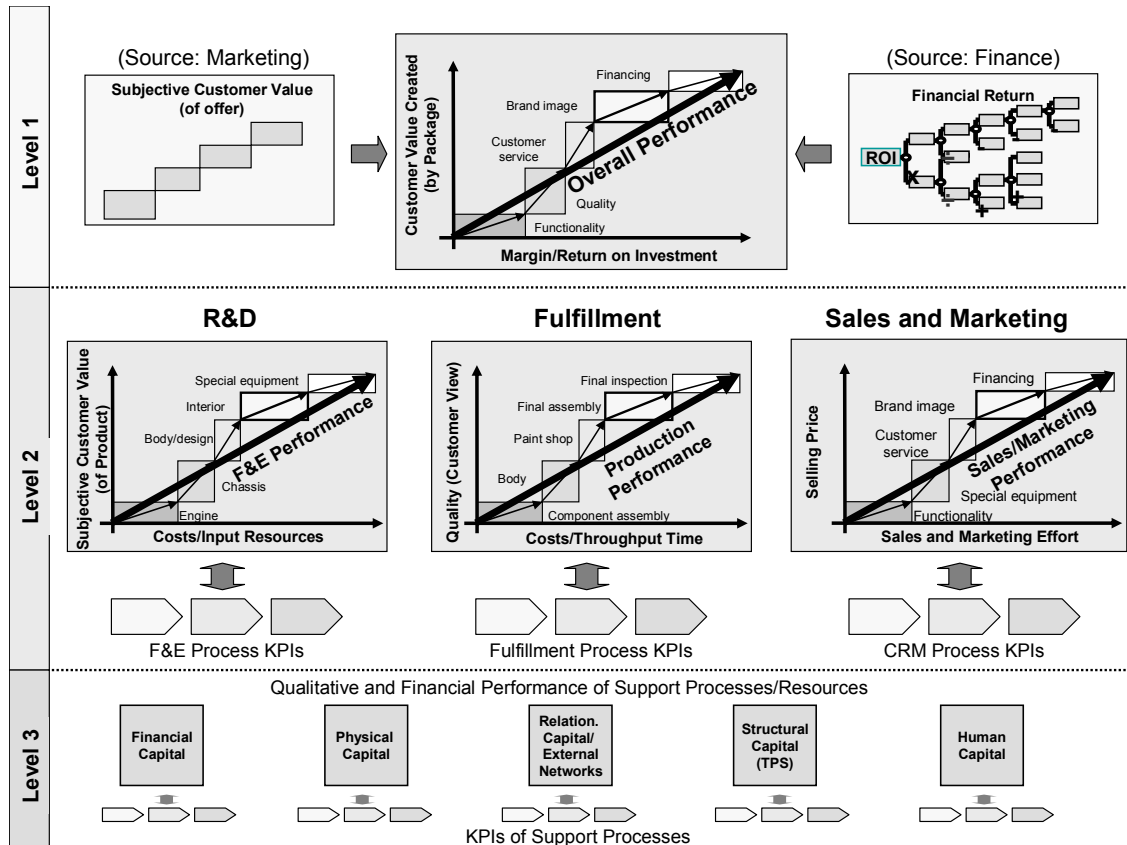


Figure 8: Possible version of a financial returns model for Toyota as a basis for designing a holistic performance measurement system³⁹ that takes both customer value and financial returns into account and that includes intangible assets

5.3 Strategic Potential Analysis / Analysis of Strategic Options

In the case of Toyota, the line of attack for strategic potential analysis could be as follows:

Analysis of Strategic Readiness: This concerns for example the impact of Toyota's globalization strategy (with its goal of setting up a global manufacturing system and transferring TPS knowledge and other operational aspects from Japan to other countries) on the different aspects of the value creation system. What are the consequences of enabling factories to absorb surges in demand from other markets for Toyota's production processes and for the organization of its supply chain processes? What are the consequences of globalizing R&D processes for the organization of

³⁸ See VAGHEFI (2001), p. 4.

³⁹ What is known as a Tableau de Bord (see DAUM (2002), pp. 297-339).

processes in the R&D centers and for the future demands on communication and information system infrastructure? And what are the consequences of this strategy for personnel development, marketing, or dealer management? As shown above, the corresponding goals and the status of the change management programs will be represented in a strategy map.

Analysis of Hidden Value Creation Potentials: Even Toyota still has unused or incompletely used potentials, such as the potential that exists in its customer base and that could be used to generate additional business. For example, Toyota's financial services business generates an infinitesimal proportion of overall value added compared with that of other carmakers. Ford, in contrast, has substantially raised its earnings outlook for the second quarter of 2004 and for the full year thanks to the strong performance of Ford Credit, its financing arm.⁴⁰ Like many other carmakers, Ford's financial services business contributes disproportionately to the company's results. But no carmaker's financials division is as productive as Ford's. The reason for this is probably that while Ford Credit is an independent company, its management system systematically enhances the synergies in customer relationship management both for itself and for the Ford Motor Company (FMC). At Ford Credit (FC), investment decisions and operational management decisions are informed by the interests of both FC and FMC with respect to the customer value that can be generated *and* the financial returns, the goal being to optimize the value added for both companies. This is achieved by sharing resources and potentials and optimizing trade-offs for mutual benefit. For example, Ford Credit uses the dealer network of FMC to sell its financial products to consumers. In return, FC lets FMC know well in advance when the leasing contract of a financial services customer will expire so that FMC can offer the customer an appropriate new model as a replacement. Customer capital has an enormous potential for creating value. A few years ago, Ford Motor Company estimated that each percentage point increase in customer loyalty generates an additional annual profit of \$100 million.⁴¹

Summary of the results of strategic potential analysis:

Toyota is better than many other automakers at continuously optimizing total factor productivity. The focus, however, has been almost exclusively on the strength of the Toyota Fulfillment System. If Toyota wants to maintain or increase its competitive advantage, both fulfillment and the other operational areas must be further optimized. The company has probably not yet fully recognized the potential offered by existing intangible assets or has not yet been able to take full advantage of them. Network assets such as the customer base, the supplier network, the dealer network, and the network with development partners harbor an entire range of options for multiplying other critical and intangible assets to create additional customer value and financial return.

⁴⁰ See FAZ.NET (2004).

⁴¹ STEWART (1997), p. 144.

6 Starting Points for Value-Based Management of Networks in the Automotive Industry based on a Intangible Assets Perspective. Outlook

Intangible assets *per se* do not create value or generate growth. They must first be combined with other production factors before such benefits can be felt. Otherwise, companies run the risk of seeing the value of their intangibles disappear into thin air – and this can happen much faster than is the case with bad investments in tangible assets. If intangible assets are to be successfully utilized in enterprise control, i.e. in performance management and for the systematic generation of value, management systems must provide a holistic view of all production factors. Only then is it possible for management to assess performance from a comprehensive perspective and to understand how effectively the different production factors, tangible and intangible assets, business processes, and work methods are interacting in the value creation system, and utilize this knowledge as a basis for optimizing enterprise total factor productivity.

It was thus not possible to properly investigate the issues raised by this article (value-based management of networks taking intangible assets into account) by considering intangible assets in isolation. Only in the actual context of a specific company's value creation system do the beneficial effects of intangible assets come into play and generate value for customers, shareholders, and other stakeholders. For this reason, they cannot be treated apart from the other factors involved in enterprise management, as this article has demonstrated. The present article, the first of two parts, also provided an introduction to intangible assets management and mapped out an approach to enterprise management in the automobile industry that considers intangible assets from the perspective of an OEM, using the example of the value creation system of Toyota Motor Corporation.

The second part of this article will discuss the second aspect of the problems raised by this article: the role of networks in the value creation system of automotive companies, how such networks can be used to create value while taking intangible assets into account, and the consequences of this for the design of enterprise management systems.

This much can be said in advance: networks are themselves intangible assets in the form of relationship capital. The decisive problems that will be discussed in the second part are therefore how companies can and do create value by combining networks/relationship capital with other resources and intangible assets, and the best approaches for successful management of this value-creation process.

Take an example from the technology sector. Cisco, a provider of network technology for Internet applications, is known for its strategy of gaining access to innovative technologies and products by acquiring smaller companies that are technology leaders. For example, in 1995 it acquired Crescendo,⁴² a company with annual sales of \$10 million, for a purchase price of \$97 million. Wall Street analysts criticized this price as hopelessly inflated. Yet scarcely a year later Cisco racked up \$500 million in sales of Crescendo products. Using the \$500 million sales figure instead of \$10 million, it is

⁴² BUNNELL (2000), pp. 35 ff.

clear that Crescendo was a bargain for Cisco. What the analysts had not considered was the fact that by combining Crescendo technology with its own customer base and sales network, Cisco was able to boost the sales of Crescendo products to a much greater degree than Crescendo would have been able to achieve on its own in the foreseeable future. This is an impressive example of a successful strategy based on intangible assets, which can act as an enormous value lever by combining different assets.

Automakers too have such options for multiplying their ability to create value, such as by using their dealer networks to sell financing and other services. Supplier networks offer a whole range of opportunities to create added value, as was discussed in the example of Toyota (close integration of suppliers into the Toyota Production System).

In addition to technical innovations such as developing environmentally friendly cars, one of the greatest challenges facing the automotive industry will be to create value by significantly enhancing the individual experience that customers have with the product.

This can be achieved by changing the attributes of the product, such as by developing a new design, a different driving experience, or new functions. It is important to keep in mind, however, that value is only created when development proceeds from the subjective customer viewpoint and not from an engineering perspective as was often the case in the past. Yet this leads to additional complexities in product development and production. Consequently, in the future automakers will do even less development and manufacturing than they do now, and will rely more strongly on their network of suppliers, design partners, and research and development contractors.

Another way to improve the customer experience is to make changes in the product environment. This could be achieved for example by emphasizing service rather than the product itself. Customers could be offered convenient, inexpensive, fast, safe, and flexible transportation from A to B, along with the opportunity to use the unproductive travel time for useful activities. A manufacturer could surround the product with a range of additional services that are provided by its partners, which together with the vehicle deliver exactly the type of customer experience desired.⁴³ In such a scenario, OEMs would compete with each other through the variety of services offered and the quality of the “integrated customer experience” and thus influence the attractiveness of their product and customer loyalty. The critical point, however, is that the product which the customer selects and pays for is no longer the car alone but the entire service package. This approach would have far-reaching consequences for the organization of product development (R&D), the fulfillment system (whose organization must more strongly

⁴³ Telematics, for example, provides mobile information and services for drivers and passengers. By means of sensors, the telematics system could detect a breakdown and automatically transmit the information to the next service point, which then sends out a repair vehicle. It is possible to incorporate a whole range of additional services into the navigation system and on-board computer, such as calculating the estimated time of arrival at the airport and performing an automatic check-in. If the driver is late, the system could display alternative flights and automatically rebook the passenger in the airline system on demand. Such features would of course require close cooperation with the airlines and reservation systems.

reflect its integration with the systems not only of parts suppliers but also of service partners), and the organization of customer relationships with automobile manufacturers. A key requirement is that an even higher proportion of the value creation system would have to be organized as a value network, resulting in an even higher share of value being generated outside the OEM in external partner networks. As was the case following World War II when the challenge was to design fulfillment systems that combine a wide product range with high quality, high efficiency, and low costs, this requirement places high demands on the capability of the automobile industry to reinvent its value creation system and come up with new solutions for designing value creation processes and management systems that can cope with the market environment of the future.

If any company is able to repeat what Toyota achieved with its Toyota Production System after World War II and design or redesign its value creation and management systems to gain a permanent competitive edge in a market environment that is becoming ever more oriented toward customer value, it will emerge as the victor in the worldwide consolidation process in the automotive industry. For automobile manufacturers (OEMs), it is already possible to identify two factors that will play a critical role in this endeavor. First, their ability to create value while continuously improving productivity in enterprise networks (with suppliers, development partners, distribution partners, service partners, and so on) for the purpose of intensifying the division of labor with its partners and consequently enabling them to better manage the complex value creation system engendered by a comprehensive customer value-based approach. Second, their ability to enhance their value potentials and those of their partners – which means managing the company or the network in such a way that makes best use of their intangible assets and those of their partners. This is the only way to sustainably create customer value and generate sufficient financial returns.

The second part of this article, which is planned for the next research report of the roundtable “Network-Based Management/Network Value Added in the Automobile Industry” will develop the insights gained here into a comprehensive model of intangible assets based network management. Individuals or companies in the automotive industry or experts in this area are welcome to contact the author to discuss these issues.

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Managing Intangible Assets



“The importance of intangible assets, the immaterial value of companies such as relationships with business partners, brand awareness and new business ideas, but also know-how, corporate culture, and the ability to innovate, has greatly increased in the last two decades. One clear indication of the trend is that the portion of a company’s total market value that exceeds its book value has increased from 40 percent of in the early 1980s to over 80 percent at the end of the 1990s. Unfortunately traditional accounting and management instruments are not able to capture these new values and report on them. But what you can’t measure, you cannot manage ! At the beginning of the 20th century, industrial mass production served as the motor to generate value; this required more complex cost accounting, beyond the abilities of previous accounting practices, to enable management to control and optimize these new value creation processes. In the same way, we must now expand accounting, controlling- and management systems to a new level, to enable companies to optimize, manage and report on today’s new value creating activities and processes”.

[Juergen H. Daum](#)

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