Knowledge Combining Competencies for Leveraging Core Products – The Case of Function Food

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Abstract

Functional food indicates a high value added that corresponds to changing consumer needs and confronts manufacturers of FF with the challenge to provide complementary pharmaceutical knowledge in processes of new product development. This idea of combining two basic competences to a firm's key competence ends up in an issue of strategic management. Assuming the organizational structure of a diversified corporate group, the idea of core competencies (Prahalad/Hamel, 1991) provides an appropriate strategic framework for the development and launching processes of functional food. The aim of the theoretical background is to highlight the strategic potential regarding functional food of a corporate business strategy in terms of leverage by using core competencies/products. The general intention of this paper is to develop a strategic framework for building up und deploying core competencies in the business field of functional food. In doing so we emphasize on a deeper understanding of competencies required in the processes of new product development.

The methodical approach of this paper is related to the idea of theorizing by means of case study research in order to respect the dynamic aspects and the complexity of the object of investigation. The results of the theoretical analysis will be compared with some examples of practice. For this purpose we analyse three case studies of functional food producers in the context of using core competencies.

Finally, we want to show that employing certain competencies in the processes of product development allows a simultaneously assembly and exploitation of core competencies and thus achieving a fast leverage.

Keywords: Strategic Management, Core Competencies, Product Innovation, Knowledge Communication

1. Introduction

The competitiveness of a firm in an innovation-based economy is primarily characterized by its capacity to launch continuous product innovations and to implement the required processes within the internal structure of an organization. Functional food is characterized by a high value added to the product core that corresponds -besides the pure supply of nutriments- to changing consumer needs. Thus, functional food can be considered as a concrete example of one of the most innovative product categories in the domain

of the food and beverage industry. We understand that functional food shows clear distinctive characteristics in comparison to conventional foods. We state that these require a very particular set of competencies in the sense of how to employ resources and capabilities in a useful way differing from the one normally used in order to market conventional food items. Additionally, we argue that the way an organization applies resources and especially competencies is crucial for the question whether these have a high impact on the firms' strategy or not.

The general intention of this paper is to develop a strategic framework for building up und deploying core competencies in the business field of functional food. In doing so we emphasize on a deeper understanding of competencies required in the processes of new product development. Thus, the purpose of this paper is threefold: first, we arrange a linkage between the strategic content and strategic process by extending the framework to an analysis of competencies in new product development. There we want to find out which competencies are required in order to generate a fast leverage effect by linking findings in the empirical research area of New Product Development (NPD) with cognitions of competence-based management. Second, we conduct a case study research by exploring three functional food producers in the context of using core competencies. Finally, we want to show with a consolidation of theoretical consideration and empirical evidence that employing certain competencies in the processes of new product development allows an assembly and exploitation of core competencies simultaneously.

We will start the study by highlighting the object of investigation with a dynamic perspective by regarding the product and market level of functional food (2). In order to achieve the research objectives mentioned before we develop an integrative framework of content and process dimension that describes new product development in the context of strategic management (3 and 4). Based on those and some lessons learned from three case studies, we show an interdependent relationship between developing and deploying core competencies in the field of functional food (4). The paper will be finished with a brief conclusion (6).

2. Dynamics of Functional Food

Functional food is characterized by a high value added in the product core that corresponds (besides the pure supply of nutriment) to changing consumer's needs. Thus, functional food can be considered as a concrete example of one of the most innovative product categories in the domain of the food and beverage industry.
When accepting changing consumer needs as a starting point, they also correspond to high-value-added products, at least in the consumers' perspective. This is due to the fact that the value added by the producer equals with the value added perceived by the consumer. In this context, we also find a change in price orientation: higher price sensibility in regard of basic food and higher price tolerance concerning value added food (Menrad, 2001).

So far, impulses coming from the market level form new product requirements and give chance to new business fields. On the other hand these changing on the product level can also affect the dynamics of

markets or industries. In this context we can observe tendencies of convergences of the food market and the pharmacy market driven by functional food. Magnitude and acceleration of market convergences in the respected market are typical indicators for the assessment of market dynamics. Market convergences are initiated and pushed by product- and process innovations which effect a change in the boundary of markets. In this context the emergence of new products or technologies allows markets to converge, that were economically separated before (Stieglitz, 2004).
In terms of convergence processes in high-tech industries, firms reinforce their efforts to find linkages between the focal firm and extern knowledge sources of the other market.
When applying these considerations to the food market we can observe convergence tendencies taking place in the field of functional food. This convergence process of the food and the pharmacy market performs with moderate speed but includes increasing importance of the application of cooperation strategies in order to obtain necessary market knowledge. On the other hand, one can expect an increasing level of competition in future by a new substitutive relationship of products bringing companies from both industries in rivalry. Thus, we can state that the food industry shows a high-dynamic development process and potential in special submarkets like those for functional food.

3. Strategic Framework for Leveraging Core Products

3.1 Core Competencies as a Strategic Content

The surrounding conditions presented in section 2 are limited to the dimensions of products and markets. In the world of strategic management and the context of achieving sustainable competitive advantage this point of view is too shortened. Recent contributions within the resource-based view are not limited to the challenge finding an optimal product/market-constellation but rather a question of limited asset immitability. Thus, competitive advantage of the firm is dependent on assets a firm plays with the game of competition as well as how it plays the game (DeLeo, 1994, p.43).According to the RBV, the strategic performance merely depends on the availability of internal resources, competencies and capabilities in order to achieve competitive advantage by exploiting the so-called VRIN-resources (Barney, 1986; Wernerfelt, 1984).
In more detailed view Foss (1997) points out that there are two versions of the RBV. The traditional stream began by clarifying the conditions for resources in order to yield rents in neoclassical equilibrium (Barney, 1986; Peteraf, 1993). This static approach concentrates on the accumulation of resources, whereas recent contributions in the field of RBV include dynamic aspects like innovation, organizational learning and competence-building in theorizing. Thus, the focus shifts from the static perspective on resources to issues of coordination and flexibility in respect of internal resources. Contributions focusing on the dynamic elements are in particular the idea of core competencies (Prahalad/Hamel, 1990) and the concept of dynamic capabilities (Teece et al., 1997; Eisenhardt/Martin, 2000).

Core Competencies are broadly associated with the definition Prahalad/Hamel as “the collective learning in the organization, especially how to coordinate diverse production skills and integrate

multiple streams of technology" (Prahalad/Hamel, 1990, p.82). In this perspective the pure accumulation of different resources show little strategic value, but value will be created by effective and efficient coordination (Sanchez/Heene/Thomas, 1996, p.27).

According to the authors three basic conditions must be fulfilled when talking about core competencies (Prahalad/Hamel, 1990; Hamel, 1994): First, a core competence must create an important contribution to customer-perceived value. That does not mean necessarily that a firm does really understand the customer in detail, but they have an abstract idea what they want to buy. Second, core competencies include an outstanding performance capability in comparison to competitors. The differentiation must be competitive unique. Marino (1996) expands this cognition to the point that a core competence supports the strategic goals of a firm by inimitability and limited substitutability. Third, core competencies can be used for a broad range of products and business units and should provide in this regard a gateway to new markets. This is a quite critical point; on the one hand it gives great potential to leverage and on the other hand it is very hard to abstract away from a particular product configuration and to imagine how to apply the competence to new product areas. In other words, a core competence perspective allows a firm to expand its view of potential opportunities. This is also a critical point for the process of new product development as we will see later on.

3.2 Core Competencies as a managerial process

Prahalad/Hamel distinguishes three broad types of core competencies. Market access competencies like brand development, sales and marketing are well discussed but refer merely to competencies when the critical processes of new product development are already completed (Day, 1994; O'Discroll et al., 2000). Integrity-related and functionality related competencies show a much stronger connection to processes of NPD and will play a role in the further discussion.

When it comes to the question how to manage core competencies, Prahalad/Hamel recommend to concentrate on four key tasks (the following is based on Hamel, 1994, p.25 ff.):

- Selecting core competencies is primarily a subject of screening the firms' environment, observing market developments and market impulses, considering competitors conduct and identifying changing consumer needs. Parts of this research area are discussed in the literature on absorptive capacity (Cohen/Levinthal, 1990).
- Building core competencies refers to the accumulation and integration of knowledge. There are different ways which are discussed in the literature on resource-based view: proprietary development, knowledge transfer, purchasing of technology-related competencies, headhunting of personal-related competencies, acquisition of business units and cooperations.
- Deploying core competencies means using resources and competencies across different business fields, requires often redeploying that competencies internally into new opportunity areas. In contrast to dynamic capabilities this does not mean a radical change but rather using leverage (logic of core competencies).
- Protecting core competencies is in contrast to technological resources not primarily an issue of protection by patents. Not only

imitation hazards are in the focus of protection efforts but also those resulting from the internal structure of an organization like lack of funding or competence-destroying fragmentations through divisionalization. And finally but not surprisingly, competitors may employ the same strategies as mentioned before in order to build up their own competencies.

Even if the authors do not explicitly state, the presentation of these task in order to man-age core competencies imply the logic of a sequential-structured process: first, the core field of competencies must be selected, than one starts to build firm specific competencies. Deploying competencies is the next step, when the previous management tasks are accomplished. We state the critical point for our examination: building and deploying core competencies are not sequential but interdependently connected when certain competencies in the process of new product development are present.

In order to provide a better comprehension of the nature of core competencies and to fix a conceptual assignment Prahalad/Hamel (1990) use the metaphor of a tree. Table 1 shows the well-known example of Sony and their core competence of miniaturization. They profit from its expertise in electronic technology, optics and precision mechanics and in its ability to translate that expertise into innovative products.

Table 1: Core Competencies of Sony (Tidd et. al. 2005, p.181-2; Steinmann, Schreyögg 1997, p.217)

Firm	Sony				
Core competences	miniaturization				
Core products	electronics		optics		precicision mechanics
Business units	receiver	walkman	cd-player	tv-set	amplifier
End products	STR DG910 STR DA1200 STR DA5200	WM EX525 WM FX197 WM EX194	SCD XB790 SCD XE597 SCD CE595	KDL 26 KDL 40 KDL 32	XM SD12 XM SD22 XM SD46

In this regard core competencies are compared to the root system of a tree which holds and nourishes the tree. These competencies affect core products which can be seen as the trunk or the major limbs. The dashed lines separating the core products indicates that there is not a strong stripline between them and al core products can be applied in all business units. These core products (in case of Sony: electronics, optics and precision mechanics) are deployed in a number of end products that are compared with the leaves or fruits (in the case of Sony: STR DG910, WM EX525 and so on) that can be found in different business units like the smaller limbs and branches of a tree (in the case of Sony: receiver, walkman and so on). However, Sony is recognized as a very successful example of leverage, because one core competence gets applied in very high number of end products.

4. Knowledge Combining Competencies

4.1 Competencies in Product Development: A review of New Product Development Literature

Within the literature of new product development Brown/Eisenhardt (1995) give an de-tailed and elaborated overview by differentiating three streams of product developments: product development as a rational plan, product development as a communication web and product development as disciplined problem solving (Brown/Eisenhardt, 1995). Most of the studies in this research field deal with the empirical analysis of success factors and statements on best practise (Cooper/Kleinschmidt, 1987; Cooper/Kleinschmidt, 1995), whereas recent studies focus on emerging markets in eastern Asia (special issue of industrial marketing management). In contrast capabilities and competencies that are in the interdependent relationship with competence building and deploying them due to the previous chapter are not in the research focus.

When reviewing the literature of new product development with a particular view on competencies two different dimensions of development-related competencies can be identified. Assuming the case that complex product units are composed of a number of components, the process of new product development requires a set of function-specific or component competencies (Clark, 1985; Clark/Fujimoto, 1991). These functional competencies must be combined with each other and in line with superior product architecture. The competence needed to perform these integrative tasks is not included within the component competencies but can be rather described by architectural competencies, which capture the interactions between components in their applicational context (Cockburn/Henderson, 1994).

In a general manner and in order to meet our focus on required competencies Danneels (2002) argues that processes of new products combine technological know-how (manufacturing knowledge) with customers' knowledge (understanding customers' needs). This combination includes material components as well as those of a cognitive dimension. Both competencies are required in this stage as well as in the stage of implementation. According to Danneels (2002) a successful product innovation requires technological and customers' competence and their linkage as a capability in the meta dimension. In a similar way of argumentation, Song et al. (2005) find marketing- and technology-related capabilities as key resources in new product development. Their examination concentrates on both capabilities in low and high technology turbulence environment. They found that a high technology turbulence environment implies harder and more uncertain conditions for competitors to imitate in a timely fashion, because the technological conditions can change rapidly.

When shifting the focus on firms' environment the relationship between focal knowledge or competencies and external knowledge become more important. In this regard Helfat and Raubitschek (2000) combine the RBV-concept of complementary assets (Teece, 1986) with the MBV-analysis of value chains (Porter, 1985). In doing so the authors highlite the impact of unutilized complementary assets that can be found along the value chain of a firm (Helfat and Raubitschek, 2000) on the potential new market access. Assuming, on the other hand, the case of market development in terms of convergence processes in high-tech industries firms enforce their efforts to find linkages between the focal firm extern knowledge sources concerning the other market. Henderson and Cockburn found these linkages (gatekeepers) as a crucial success factor for knowledge creation in the pharmaceutical industry. Powell et al. (1996) found significant alliance relationships in R&D used by firms in the biotech sector.

4.2 Competencies for Developing Functional Food Product

For the further investigation we are going to emphasize on those capabilities with a strong strategic impact on the meta level. In this section we try to reflect the findings of the NPD-Literature in the light of the strategic content dimension of core competencies. As an intermediate result we identify four types of (meta-) competencies that play a key role in the processes of new product development of functional food.

Combining different Component Competencies

There is a strong connection between platform development and the leverage opportunities with a core competence as an architectural competence. Leveraging is the basic principle on which the platform concept is based on (Koruna, 2004). Strategic platform concepts in the fields of automotive, aerospace, e-commerce and software, computer, electronics and software have been investigated by Kogut and Kim (1996).

In the case of functional food these components include nutrition solutions on the one hand and pharmaceutical solutions on the other hand. Both are required for the establishment of stable core competencies in the long run. Employing a platform strategy providing a complex architecture of component products will become a critical success factor in order to leverage core products to a high number of end products.

Combining customers knowledge with technological know-how

As already mentioned the development of new functional food products require extensive R&D efforts where technological knowledge on the one hand and a high impact of customers expected added value on new product development requirements on the other hand is needed. The great challenge is to combine both competencies. A very simple but nevertheless efficient way to create leveraging of knowledge and competencies is the process of identifying further deployment for an application of yet existing products (Koruna, 2004).

Often, alternative uses of a product are not discovered by the firms themselves but rather by the firms' customers (Leonard and Swap, 1999). Identifying alternative applications of a technology or competencies largely depends on a firm's absorptive capacity (Cohen and Levinthal, 1990) and the firm's ability to tap the customers' absorptive capacity (von Hippel, 1986).

Combining focal knowledge with external knowledge along the value chain

External knowledge can be obtained through access of non-institutional ways like recruiting personnel directly from other companies or even competitors (Dussauge et al., 1992) doing extensive reverse engineering. Institutional forms of obtaining access to external knowledge are licensing, technology buying, contract R&D, and all kinds of cooperation forms like joint ventures, strategic alliances, virtual corporations and mergers and acquisition (Koruna 2004). In general firms deploy the whole spectrum of external technology acquisition possibilities, each mode of transfer having its specific advantages and disadvantages (Barabaschi, 1992).

The food processing industry as well as the pharmacy industry underlay a very complex value chain, so they have to ensure a close cooperation along the value chain in order to establish an authentic and reliable health claim for functional food.

Combining focal knowledge with external knowledge of a complementary market

As already indicated in section 2 of this paper convergence processes let firms reinforce their efforts to find linkages between the focal firm and extern knowledge sources of the other market. Cockburn and Henderson found that those linkages (gatekeepers) are a crucial success factor for knowledge creation in the pharmaceutical industry (Cockburn and Henderson, 1997). Powell et al. (1996) found significant alliance relationships in R&D used by firms in the biotech sector.
Food processing companies who intend to establish a core competence field in functional food need to connect the focal knowledge with those of the complementary market because of the market convergence. In this regard, the analysis of market pulses shows a high importance of long-term R&D-activities in order to build up experience in a quite sophisticated field of research. Furthermore, complementary assets can be found in terms of market convergences between actors of the pharmacy industry and those of the food market.

5. Developing Core Competencies in the field of Functional Food: empirical evidence from three cases

The analysis so far have shown on the one hand the dynamics on the product- and market level in the field of functional food (as discussed in section 2.1) and on the other hand three basic conditions that must be met when talking about core competencies (as discussed in section 3.1). Combining both aspects indicates some congenerous linkages. In this regard, the conceptual claim of an important contribution to the customers-perceived value is due to the cognition of the changing consumer needs that ends up in products with an abstract expected value added (like wellness-creating or safety-signalling food etc.). When different firms compete for the differentiate uniqueness, they try to install a high-value added core in range of attractive business fields (organic food, convenience food etc.). Finally, a core competence was characterized by its potential application for a broad range of products and business units as a gateway to new markets. Thus, the emerging added values expected by consumers correspond to changing product requirements in the process of new product development which demand a rethinking within the process-related competencies.

5.1 The Case of Unilever

We assume the case that Unilever is aiming in the long-range to build up a new core competence in the field of functional food, which should not be limited (in terms of the potential leverage) on the current range of products.

In Table 2-4 we intend to use the conceptual basics of Prahalad/Hamel´s core competencies applying the tree-metaphor to the

functional food case. In this regard Unilever is currently the sole enterprise in Germany with proved health claim labelling.

Table 2: Core Competencies of Unilever

Firm	Unilever				
Core competencies	Nutripharm-Cardio				
Core products	β-Sitosterol		Omega-3-Fatty-Acids		
Business units	frozen products	Dough products	sauces + soups	oils and fats	dairy products
End products				Becel Vita 3 Rama Culinesse Becel Omega 3 Becel pro active	Becel yogurt Becel milk

Thus, the core competence can be described as the abstract capacity to combine basic nutrition solutions (traditional competence) with pharmaceutical solutions (we call it Nutripharm) that correspond to to the objective of preventing cardiovasculary diseases. So far, Unilever developed two core products that are conform to the core concept of cardiovascular strengthening ingredients (ß-Sitosterol and Omega-3-fatty acids). Up to now, these are leveraged very moderately to three business units (margarine, milk and yogurt). In the business unit of margarine Unilever is present on the market with two proper end products (Rama Omega-3 and Becel pro active) that fulfill the health claiming requirements.

5.2 The case of Danone

Among the big food processing corporations Danone is recognized as a firm with a bounded diversified organizational structure and a specialization in diary products like cream, pudding and so on. However, in the last years Danone expanded its divisional structure with the acquisition of Evian Water and LU Biscuits. In 2007 the take over of the dutch baby food producer Numico is planed. One could evaluate these actions as preliminary stages of a long-term corporate core competence strategy.

Table 4: Core Competencies of Danone

Firm	Danone					
Core competencies	Nutripharm-Gastro					
Core products	Digestivum Essensis®			L. Casei Defensis		
Business units	cream	pudding	yogurt	Milk drink	Curd	cream cheese
End products			Activia	Actimel		

Also Danone may establish a core competence field in the area of functional food by combining basic nutrition solutions with pharmaceutical solutions. In Contrast to Unilever the objective is not the prevention of cardiovascular diseases but of gastro intestinal diseases (Nutripharm-Gastro). In this regard Danone developed two core

products (Digestivum Essensis® and L. Casei Defensis) that are also applied in two business unit (yogurt and milk drinks) and two end products (Activia and Actimel). Both core products belong to the probiotics and are utilized in diary products.
So far Danone does not exploit its core products for leverage to the related business units.

5.3 The Case of Nestlé

In contrast to the focussed R&D activities of Unilever or Danone Nestle´ is broader positioned. The strategy of knowledge acquisition was not limited to one single way but includes a variety of different measures. Nestlé has conducted the development of health related issues (in-house) as well as using the competence of combining focal knowledge with external knowledge of a complementary market (see section 4.2). In this context, the business unit of medical nourishing from the Swiss pharmazeutical producer Novartis was acquired from Nestlé in December 2006.
The definition of the core competency concept also corresponds to the combination of basic nutrition with pharmaceutical solution but is not limited to the objective of preventing cardiovasculary and gastro intestinal diseases. Nestlé is the only functional food player who tries to implement both aspects in its corporate core competence strategy. The assigned core products are Ω-3/Ω-6-fatty-acids, β-Glucan (including secondary plant Compounts and vitamins) and Lactobacillus LC1. Up to this point Nestle´ seemed to perform with the most extensive leverage effect, for the first instance.

Table 3: Core Competencies of Nestlé

Firm	Nestlé				
Core competencies	Nutripharm-Cardio/Gastro				
Core products	*β-Glucan + SPC*		Ω-3/Ω-6-Fatty-Acids		Lactobacillus LC1
Business units	dough products	beverages	frozen products	Oils and fats	dairy products
End products	*muesli bar energy bar*	*vegaplus*		Thomy Gold	LC 1 milk drink LC 1 yogurt

In a more detailed view it becomes obvious, that the fatty acids are used in the business unit oils/fats in just one end product (Thomy Gold) whereas lactobacillus LC1 belong to the probiotics and are utilized in just two diary products (LC1-milk and LC1-yogurt. In 2005 Nestlé introduced the product-line Nutrel, which was strongly advertised as combined nutrition and wellness food. The distribution was limited to pharmacies and drugstores. The underlaying core product of Nutrel was applied also in only three products (the wellnessdrink vegaplus, muesli bar and energy bar). After a short period of time the complete Nurtel division was taken out of the market, because the choosen distribution channels could not achieve the necessary sales volume. Thus, also in the case of Nestlé the leverage effect has not been carried out very successfully.

5.4 Summery and critical reflection

Since the all three cases expose a premature stage in the development of core competencies the question comes up how they can be built up and deployed simultaneously. In contrast the four key tasks (as presented in section 3.1) in order to mange core competencies in the concept of Prahalad/Hamel imply a sequential relationship. These considerations can be seen in interrelation to those of Tidd/Bessant/Pavitt (2005) differentiating five stages in the process of innovation. Both early stages are strongly connected to issues of strategic content, when scanning a firm's environment about potential innovations and formulating the fitting strategy. Since functional food is widely considered as one of the fastest growing area in the food industry with great innovative potential we argue that these stages are already completed and that they have a smaller impact on future challenges. In the third stage of 'enabling effective knowledge acquisition' we see a similar contextual situation. Thus, we state that the process of new product development can be used towards a simultaneously critical linkage between building up und deploying core competencies by focussing meta-competencies that enable effective knowledge acquisition (associated to the discussion in section 3.2).

In the context of enabling effective knowledge acquisition manufacturers of functional food are confronted with the challenge to provide complementary pharmaceutical knowledge for the process of new product development. Within the boundaries of an enterprise competencies are required in order to identify experts within the firm, to integrate different groups and primarily to build up and develop cross-functional teams. Furthermore, an even more crucial competence enabling collaboration and alliance beyond the boundaries of the firm concerned become a key element of success. Therefore, we have to focus on external experts, pharmaceutical firms as complementary co-workers, gatekeepers and on the involvement of suppliers in the innovation.

The combination of technological know-how and customers' knowledge mentioned above demonstrates the importance of complementary assets (Milgrom/Roberts, 1990; Stieglietz/Heine, 2007) in issues of managing innovation and market dynamics. Concerning managing innovations, it comes to complementary assets when systemic innovation requires competencies from two different core competence areas, which are in complementary relation regarding the underlying targeted innovation. Concerning market dynamics, complementary assets emerge in the case of market convergences, where firms try to obtain knowledge of the complementary market.

5. Conclusion

The aim of this study was to develop a strategic framework for building up und deploying core competencies in the business field of functional food. We finish the paper with a brief summary of the main results. The analysis on the product/market level of functional food showed the dynamic implications of expected value added and market convergences on the product requirements in new product development. A critical examination of competencies in processes in new product development disclosed the relevance of four meta competencies (architectural competence (1), combining customers knowledge with technological know-how (2), combining focal knowledge with external knowledge along the value chain (3) and with those of the complementary market (4)). Furthermore, we presented in three case

studies the different approaches of the development of functional food products in the context of the corporate core competence strategies of multinational food processing groups. All cases provide differences in the underlaying innovation strategy but have a very moderately leverage effect in common. Neverteheless, the theoretical framework indicated that core competencies in the area of functional food can be simultaneously built up and deployed by employing the four key competencies in the processes of new product development.

References

Barney, J., 1986, "Strategic Factor Markets: Explications, Luck, and Business Strategy," *Management Science*, 32(10), 1231-1241.

Barabaschi, S., 1992, "Managing the growth of technical information," in: Rosenberg, N., R. Landau, and D.C. Mowery (eds.), Technology and the Wealth of Nations, Stanfort CA: Stanfort University Press.

Brown, S., and K. Eisenhardt, 1995, "Product Development: Past Research, Present Findings, and Future Directions," *The Academy of Management Review*, 20(2), 343-378.

Clark, K.B., and T. Fujimoto, 1991, "Product development Performance," Bosten, MA: Harvard Business School Press.

Clark, K.B., 1985, "The Interactions of Design Hierarchies and Concepts in Technological Evolutions," *Research Policy*, 14(5), 235-251.

Cockburn, I., and R. Henderson, 1997, "Public-private interaction and the productivity of pharmaceutical research," Cambridge, Mass.: NBER.

Cohen, W., and D. Levinthal, 1990, "Absorptive Capacity: A New Perspective on Learning and Innovation," *Administrative Science Quarterly*, 35(1), 128-152.

Cooper, R., and E. Kleinschmidt, 1987, "New products: what separates winners from losers?," *The journal of product innovation management*, 4(3), 169-184.

Cooper, R., and E. Kleinschmidt, 1995, "New product performance: keys to success, profitability & cycle time reduction," *Journal of marketing management*, 11(4), 315-337.

Danneels, E., 2002, "The Dynamics of Product Innovation and Firm Competences," *Strategic Management Journal*, 23(12), 1095-1121.

Day, G., 1994, "The capabilities of market-driven organizations,"

Journal of Marketing, 58(4), 37-52.

DeLeo, F., 1994, "Understanding the Roots of Your Competitive Advantage. From Product/Market Competition to Competition as a Multiple-Layer Game", in: Hamel, Gary and Aimé Heene-Ed., Competence-based Competition, Chichester: Wiley, 35-55.

Dussauge, P., S. Hart, and B. Ramanantsoa, 1992, in: Strategic Technology Management, Chichester:Wiley.

Eisenhardt, K.M., and J.A. Martin, 2000, "Dynamic Capabilities: What are they?," *Strategic Management Journal*, 21(10-11), 1105-1121.

Foss, N., 1997, "The Resource-Based Perspective: An Assessment and Diagnosis of Problems," *DRUID Working Papers*, 97(1).

Hamel, G., 1994, "The Concept of Core Competencies", in: Hamel, Gary and Aimé Heene-Ed., Competence-based Competition, Chichester: Wiley, 11-33.

Helfat, C.E., and R.S. Raubitschek, 2000, "Product Sequencing: Co-evolution of Knowledge, capabilities and Products," S*trategic Management Journal*, 21(10-11), 961-979.

Hippel, E., 1986,"Lead Users: A Source Of Novel Product Concepts," *Management Science*, 32(7), 791-805.

Kogut, B.W., D. Kim, 1996, "Technological Platforms an Diversification," *Organization Science*, 7(3), 283-301.

Koruna, S., 2004, "Leveraging Knowledge assets: Combinative capabilities – theory and practice," *R&D Management*, 5(3), 505-516.

Leonard, D., and W.C. Swab, 1999, " When Sparks Fly. Igniting Creativity in groups," Boston MA: Harvard Business School Press.

Marino, K.E., 1996, "Developing consensus on firm competencies and capabilities," *Academy of Management Executive*, 10(3), 40-51.

Menrad, K., 2001, "Innovations at the Borderline of Food, Nutrition and Health in Germany: A Systems' Theory Approach," *Agrarwirtschaft*, 50(6), 331-341.

Milgrom, P., and J. Roberts, 1995, "Complementarities and fit Strategy, structure, and organizational change in manufacturing," *Journal of Accounting and Economics*, 19(2), 179-208.

Peteraf, M.A., 1993, "The cornerstones of competitive advantage: a resource-based view," *Strategic Management Journal*, 14(3), 179-191.

Porter, M.E., 1985, "Technology and competitive advantage," *The Journal of Business Strategy*, 5(3), 60-79.

Powell, W.W., K.W. Koput, and L. Smith-Doerr, 1996," Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology," *Administrative Science Quarterly*, 41(1), 116-145.

Prahalad, C.K., and G. Hamel, 1990, "The Core Competence of the Corporation," *Harvard Business Review*, 68(3), 79-91.

Sanchez, R., A. Heene, and H. Thomas, 1996, "Dynamics of Competence-based Competition: Theory and Practice in the New Strategic Management," New York: Pergamon.

Song, M., C. Droge, S. Hanvanich, and R. Calantone, 2005, "Marketing and technology resource complementarity: an analysis of their interaction effect in two environmental contexts," *Strategic Management Journal*, 26(3), 259-276.

Steinmann, H., and G. Schreyögg, 1997, "Management-Grundlagen der Unternehmensführung, Konzepte-Funktionen-Fallstudien," (4d ed.), Wiesbaden, 216-217.

Stieglitz, N., 2004, "Strategie und Wettbewerb in konvergierenden Märkten," Wiesbaden: Dt. Univ.-Verl.

Stieglitz, N., and K. Heine, 2007, "Innovations and the role of complementarities in a strategic theory of the firm," *Strategic Management Journal*, 28(1), 1-15.

Teece, D.J., 1986, "Profiting from technological innovation: implications for integration, collaboration, licensing and public policy," *Research policy*, 15(6), 285-305.

Teece, D.J., G. Pisano, and A. Shuen, 1997, "Dynamic Capabilities and Strategic Management," *Strategic Management Journal*, 18(7), 509-534.

Tidd, J., J. Bessant, and K. Pavitt, 2005, "Managing innovation: Integrating technological, market and organizational change," 3d ed.), Chichester: Wiley.

Wernerfelt, B., 1984, "A Resource-Based View on the Firm," *Strategic Management Journal*, 5(2), 171-180.