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A Strategy for the Management of Digital Information Products

Customer Integration and Customer Involvement

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To those who believe that the impossible is possible,
and to those who believe that the possible is impossible

1 Introduction

The first chapter provides an overview of the objective and the structure of this thesis. In this thesis, a sequential hybrid strategy for the management of digital information products will be developed. Information products are rented or sold by information companies. Farther on, information companies can be described as socio-technological, targeted and open systems [Ferstl and Sinz, 1998, pp. 59-66] with at least one strategic business unit (SBU) that sells or rents (digital) information products.

Societal, technological, and organizational changes offer new opportunities for these information companies, but also lead to the question how companies can find an appropriate strategy to maintain competitiveness in a changing environment. These companies need clear strategies for the strategic business units (SBUs) that manage the production of goods and services along the supply chain on the one hand, and the evolution of goods and services throughout their lifecycle on the other hand.

The objective of this thesis is to unite findings from the different research fields of media management (MM), product lifecycle management (PLM) and supply chain management (SCM) under the common roof of a sound, customer-oriented strategy to test the first hypothesis that a customer-oriented strategy fits best for business units that sell or rent digital information products.

The second hypothesis puts into words that the involvement of customers at the different stages of the product lifecycle benefits the company as a whole by fostering innovation and competitiveness. Science and technology combined offer many interesting approaches to include “the voice of the customer” [e.g. Cooper, 2001, p. 87; Gorchels, 2003, p. 13] in new or existing information products.

1.1 Background and Motivation

At the beginning of the 21st century, the individual customer plays a more important role in the mass market for information products than ever before. Traditional mass markets like the media market are divided into smaller fragments, as individualization in the society and increased mobility lead to changing product usage behavior and individualization of demand, which again influences customers' product preferences.

These societal changes can be observed globally, and not only information products are affected. In the USA, for example, the consumption of dairy products dropped from 585,8 pounds in 1994 to 575,6 pounds per inhabitant in 1995. As the figures constantly dropped further the following years, milk producers investigated and found out people were consuming less dairy because they spend less and less time at home – the place where 80% of milk was traditionally consumed. One company solved the problem by introducing new, resealable packaging so that milk could be consumed on the move [Edwards, 1998]. This rather simple innovation was not only sufficient to increase sales in 1998 by more than 200 percent for the Chicago area alone, but had also the potential to revitalize a mature market in the long term [LaSalle and Britton, 2003, pp. 62-63].

Besides societal changes, technological advances in the area of information and communication technology (ICT) facilitate the cost-efficient digital production and distribution of information products without change of representation from digital to analog or vice versa. New and interactive media like Internet and mobile networks exist today, where digital information can be distributed to end customers in their pure, virtual form, saving costs for physical handling and shipping. From there it is understandable that new media already compete with traditional media like television, radio and printed products, even if up to now the "core of electronic commerce" [Choi, Stahl and Whinston, 1997, pp. 16-20] – business transactions in a digital marketplace, combined with the exchange of digital information products, between digital agents – is still a vision that is only partly realized, as too many potential customers remain locked out.

While production technology has made amazing progress, the digital distribution of information products – at least in the area of business-to-consumers (B2C) – still remains problematic, as the resources for physical distribution have to be

maintained simultaneously. In order to come closer to the core of electronic commerce, broadband network access on the consumer side is one essential factor. Besides availability of mobile networks, broadband Internet access can be seen as an enabler for innovative digital products or services, especially when they depend on high bandwidth. According to a recent study by the Organization for Economic Cooperation and Development (OECD), broadband diffusion is steadily increasing in the 30 OECD member states, but the average broadband penetration throughout the member states has only reached 11,8 subscribers per 100 inhabitants up to June 2005. Korea maintains the highest penetration at 25,5 percent [OECD, 2005].

Organizational changes are a third factor influencing the core business of information companies. A trend towards smaller organizations that act in loose, cooperative networks can be observed [e.g. Hagel, 1996, pp. 5-6; Schary and Skjøtt-Larsen, 2001, pp. 21-22; Picot, Reichwald and Wigand, 2003, pp. 6-7]. The ongoing modularization of organizations as well as products strongly interacts with the strategy of companies. For example, Microsoft recently announced the restructuring of the enterprise into the three business units Platform products & services, Business division and Entertainment & devices [Microsoft, 2005]. This restructuring can be seen as a reaction to the diminishing importance of base technology and increasing importance of business services and media content that are provided online over digital networks, on top of a common, invisible infrastructure.

The progressing integration of the European market and increasing global competition in general, together with shortening product lifecycles provide further challenges for information companies. Schary and Skjøtt-Larsen describe the phenomenon in their book as follows:

> "The world now faces global competition, focusing on rapid response to customer needs at low cost, accompanied by market access and rapid deployment of technology. A significant shift is taking place from mass production with standardized products and services towards meeting individual customer requirements for both products and services."[1]

This shift from pushing products to the market, based on demand forecast, to market pull, driven by real-time customer demand, offers new opportunities for

[1] [Schary and Skjøtt-Larsen, 2001, p. 22].

information companies to provide more variety and customized information products, products that can be adjusted to the preferences and needs of the individual customer prior or during usage.

Mass customization is one possible answer to these changes. In a study about mass-customized watches, Franke and Piller actually found out that end users willingness to pay (WTP) could be increased by an average of approximately 100 percent when offering individual products, and that the user acceptance of this offering was high [Franke and Piller, 2004]. Thus, are customized products a solution to get closer to individual customers?

The personal computer (PC) is a good example for a highly customizable product on both hardware and software side. Despite of many advantages, this device still needs some expert knowledge for maintenance and operation, and it is hard to use for most inexperienced novices, especially in the case of failures. Even in the midst of what some people call “digital revolution” [WSIS, 2004; Brack, 2003, p. 9], there is still much room for improvements concerning user-friendliness, adaptability and usability of information products, and who knows better about possible improvements than the customers themselves?

1.2 Research Question

Companies that sell or rent (digital) information products, namely media/entertainment/advertising/software companies and online service providers, often struggle with the new volatile environment. These information companies need clear strategies for the strategic business units (SBUs) that manage the production of goods and services along the supply chain on the one hand, and the evolution of goods and services throughout their lifecycle on the other hand. Therefore, the main question in this thesis is:

> *Question: Which strategy is right to ensure competitiveness and continuous success of a business unit selling or renting digital information products?*

If a business strategy can be recommended, it would also be interesting what the implications of this strategy are and, first of all, how to implement it. So strategy as well as implementation aspects are important to come to a sound recommendation.

1.3 Methodology

This thesis is based on literature research at the University of Koblenz and the Copenhagen Business School (CBS) in Denmark. A literature review to identify the key pieces of existing relevant research has been undertaken, and the synthesis of findings from different sources to answer the research question is the objective.

At first, the two expressions ‘information products’ and ‘strategy’ need to be defined to be able to answer the question exactly. The concept of the product lifecycle and the considerably better known concept of the supply chain have been chosen to serve as a frame while further approaching the question. To continue from there, two hypotheses have been formulated which could be useful to clarify later details.

Berthon, Hulbert and Pitt summarize the ongoing debate in the field of strategic management. The two guiding templates for a business strategy being discussed are customer orientation and innovation orientation [Berthon, Hulbert and Pitt, 1999, p. 37]. Hypothesis 1 picks up this common idea and reads as follows:

> *Hypothesis 1: A customer-oriented strategy suits best for business units selling or renting digital information products.*

As Govindarajan and Gupta state, competitive advantage is not only a function of how well the company plays the existing rules of a game, but also depends on the ability of a company to radically change the rules of the game [Govindarajan and Gupta, 2001]. The ability to innovate therefore seems to have a positive effect on competitiveness. Hypothesis 2 is concerned with the effect of customer involvement on innovation and therefore also on competitiveness:

> *Hypothesis 2: The involvement of customers at different stages of the product lifecycle benefits the whole company by fostering innovation.*

Examining the question and the hypotheses, three main research objects can be identified, which are depicted in figure 1. The intersection of all three research objects is of special interest. Therefore, Part III of the thesis is dedicated to customer orientation and involvement in the product lifecycle of information products. The character of information products together with definitions of strategy and theory about product lifecycle and supply chain are described in Part I. Customer orientation and customer integration in the supply chain is the main topic of Part II.

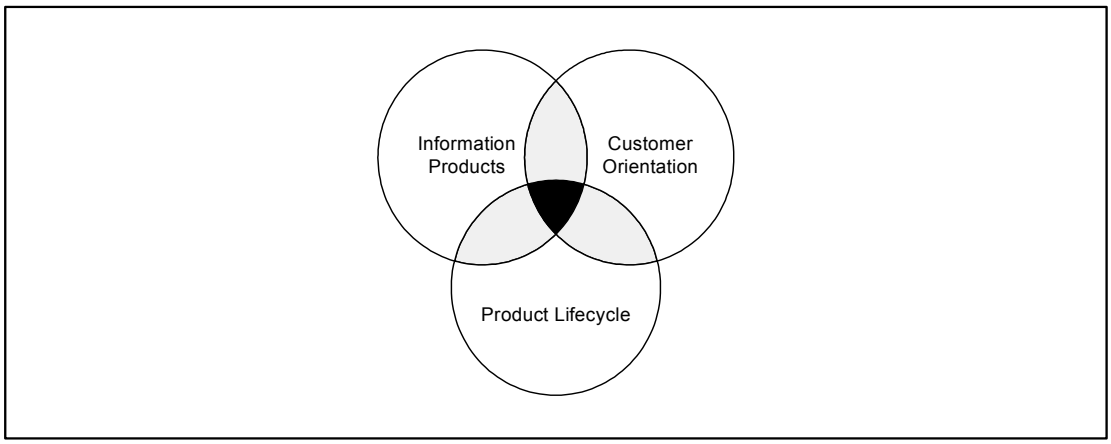

Figure 1. The Three Research Objects and Their Interdependencies

1.4 Outline of the Thesis

After this introduction, chapter 2 starts with the definition of central strategic terms. Then, the options for business strategies and hybrid strategies in the context of information companies are sketched.

Chapter 3 essentially describes the theory of the product lifecycle, which can be compressed to the three main stages new product development (NPD), product management (PM) and revitalization/retirement of products. Retirement and revitalization stages respectively play an exceptional role at the end of a product lifecycle. The chapter ends with a critical observation of the concept and managerial application of the lifecycle view in combination with the supply chain concept.

In chapter 4, first the general characteristics of information products are illustrated. For example, production of information goods is usually closely connected with high fixed costs, which contrasts with rather low variable cost for reproduction and possible marginal costs near zero for digital distribution. Information products are also experience goods. Their value can only be determined after consumption. Different actions can be undertaken to increase customers' trust in a new product's quality prior to purchase. The degree of digitalization and modularization are further, but not necessary properties of information products, even if these properties can increase utility for both customers and producers.

Chapters 5 till 7 cover the subject of customer orientation from a supply chain management (SCM) perspective. Chapter 5 paves the way towards a customer-oriented strategy. Based on the preceding chapters and against the background of hybrid strategies, Porter's corporate strategy types of cost leadership and

differentiation are reviewed. Business strategy between innovation and customer orientation is the next topic of this central chapter that provides a generic framework for business strategy in the end. Applying Berthon, Hulbert and Pitt's strategy matrix approach, four basic strategic orientation modes of a business unit are elaborated and discussed. The customer orientation mode is further analyzed in the following chapters.

Chapter 6 leads over to customer integration as a possible implementation method of strategic customer orientation, and chapter 7 introduces the basic ideas of mass customization, a method to integrate the customer or rather his/her preferences in the production process along the supply chain. A model for customers' information needs and implications for the competitiveness of a business unit offering customized products closes this part.

Chapter 8, 9 and 10 deal with customer orientation from the perspective of product lifecycle management (PLM). Customer involvement is a method to implement strategic customer orientation in the product lifecycle. Chapter 8 introduces customer involvement as a possible but debatable success factor of new product development (NPD). The broader idea of open innovation is introduced next. Finally, the differing effectiveness of customer involvement in different phases of the new product development process is discussed.

In chapter 9, the management of information products and the evolution of information products from market introduction to mature products are discussed. Here, the question is answered why product management in practice predominantly deals with incremental product innovation. In chapter 9.3, a new and generic framework for the development of tactical plans is proposed and demonstrated in the light of a sequential hybrid business strategy.

Chapter 10 finally deals with the revitalization and retirement decision for mature products at the end of their lifecycle. The revitalization or retirement of mature products is as important for a company as the development of new products. The special role of mass customization and customer-oriented strategies is discussed in this context.

The thesis ends with the conclusion in chapter 11. Based on the strategy developed in this thesis, the relationship of sequential and simultaneous strategies is discussed. The question and the hypotheses from the first chapter then are in the center of attention at the close of the thesis.

Part I

THEORETICAL FRAMEWORK

2 Strategy

In various empirical studies, H. Igor Ansoff found that the competitive environment of companies tends to become more and more dynamic and complex (turbulence) while companies need more and more time to react (inertia) at the same time [Ansoff, 1979, pp. 31-32; Schneck, 1994, p. 642]. From the evidence provided by these studies, he concluded a general need for strategic planning, which till this day is the basis for successful later strategy implementation and strategy control.

Other authors refined this process. Patrick Haertsch [2000, pp. 165-186] for example proposes a five-step process to develop and implement a strategy for electronic commerce:

- Analysis of opportunities and threats (environment analysis)
- Identification of resources (analysis of strengths and weaknesses)
- Definition of the strategy
- Implementation of the strategy
- Efficiency review

John Stark [2005, p. 195], while developing a strategy for product lifecycle management (PLM), describes a similar approach with five successive steps (Collecting information, Identifying possible strategies, Selecting a strategy, Communicating the selected strategy, Implementing the strategy). As a final example, Linda Gorchels' planning framework for product managers [Gorchels, 2003, p. 37] is outlined. The framework comprises 5 steps from Environmental scan, Determining goals & objectives and Definition of strategy & tactics to Implementation of plans and Tracking of results.

All these approaches are obviously refined versions of the original process of strategic planning, implementation and control. Strategic planning starts with a strategic analysis of the company (inside-out) and its environment (outside-in), with the goal of defining strategy and implementation plans [Schneck, 1994, pp. 645-646].

Within recent years, as a result of the discussion about advantages and disadvantages of the market-based (outside-in) and resource-based (inside-out) view on a company, the SWOT-analysis has been rediscovered as an effective tool to start a strategic planning cycle. A SWOT-analysis comprises the analysis of strengths and weaknesses (capabilities) the company possesses, and the analysis of opportunities and threats (environment states and trends) it faces in its current environment [Andrews, 1987, p.18; Collier, 1995, p. 53; Haertsch, 2000, pp. 86-87; Stark, 2005, pp. 212-213]. Capabilities represent an inside-out or resource-based perspective, while opportunities and threats provide an outside-in or market-based view on the company[2]. In accordance with the general contingency theory, an optimal fit between internal capabilities and external environment is the goal of every successful strategy.

A clear strategy and implementation plans are important for the success of a company. However, many other factors like the organizational, technological and societal developments influence the success of a company as well as the choice of a specific strategy. Vice versa, a specific strategy can surely influence internal as well as external factors in general. “The foundations of corporate success are unique to each successful company”, states Kay in this context [1993, p. 19], and it is important to stress that a strategy is not the only success factor for a company.

External information about markets, customers and competition needs to be collected, and objective internal evaluation of the company’s assets and resources needs to be carried out before a detailed strategy and tactical/operational implementation plans can be formulated. Developing a strategy requires strategic thinking, which is broad and deals with long-term objectives. Developing a plan requires tactical or operational thinking, which is focused and deals rather with short-term objectives [Gorchels, 2003, p. 109; Stark, 2005, p. 131].

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[2] Many authors agree on the complementarity of market-based and resource-based view, see e.g. [Bleicher, 1997, p. 52] or [Haertsch, 2000, p. 147]. Bleicher quotes 3 further external sources, and Haertsch quotes 6 other authors. The common ground of both views is often seen in the goal of creating highest-possible value or value proposition for the customer [e.g. Bleicher, 1997, pp. 39-42].

2.1 Some Definitions

In this chapter, various common strategic terms are defined and differentiated from each other. Additionally, the term 'information company' is defined.

Information Company

The term information company, as used in this thesis, refers to a sociotechnological, targeted and open system [Ferstl and Sinz, 1998, pp. 59-66] with at least one strategic business unit (SBU) that sells or rents (digital) information products. As nearly every information product is created with more or less ICT support in the industrial society, no explicit distinction is further made between digital and non-digital information products. However, digital and physical distributions of information products need to be distinguished, as the marginal costs of digital distribution can fall close to zero, whilst the marginal costs of physical distribution are significantly higher.

Insa Sjurts names the three components of media products as Information, Entertainment and Advertisement [Sjurts, 2002, p. 7], while Hui and Chau [2002] classify digital information products into three categories of Tools & utilities (software), Content-based digital products and Online services; therefore media/entertainment/advertising as well as software companies and online service providers can be enumerated in the set of information companies.

Mission

The Florida Intl. University defines a mission as "The core purpose of an organization – its reason for existing" [FIU, 2001]. The State University of New York in its current strategic plan defines that a mission "helps explain the distinctiveness of an institution and represents assumptions and purposes that guide its planning and activities. It describes the organization's 'reason for being'" [SUNNY Cobleskill, 2004].

Vision

Linda Gorchels states that the strategic vision for a company or a product could be an example for a long-term goal [Gorchels, 2003, p. 40]. A vision can be defined as "The long-term desired future state of an organization. Visions should inspire and motivate" [FIU, 2001]. As quoted by Stark, the *Oxford English Dictionary* defines a vision as "A mental concept of a distinct or vivid kind; an object of mental

contemplation, especially of an attractive or fantastic character, a highly imaginative scheme or anticipation" [Stark, 2005, p. 130]. A vision hence is a future goal or state that is desirable to be reached.

Goals/Objectives

According to the FIU Millennium Strategic Planning Handbook, goals are "The desired end results" [FIU, 2001]. Contrary to goals, objectives are "Specific and measurable means for accomplishing goals" [FIU, 2001]. While objectives should be measurable, goals do not need to be. Therefore, Gorchels proposes that an objective should be SMART, i.e. Specific, Measurable, Achievable, Result-oriented and Time-based [e.g. Gorchels, 2003, p. 40] to allow for later control of the achievement of objectives.

Strategy

Strategies can be classified according to different criteria, such as direction of growth (growth strategies, hold strategies, shrink strategies), market behavior (offensive strategies, defensive strategies), regional scope (local strategies, multinational strategies, global strategies) or organizational scope (corporate strategies, business strategies, functional area strategies) [Schneck, 1994, p. 644]. Latter classification is the most important for strategic planning and is the one applied in the following:

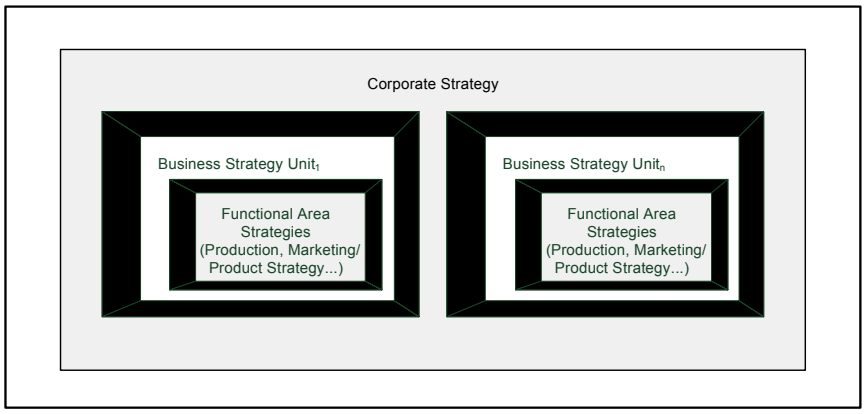

Figure 2. Organizational Levels of Strategy in a Company
[based on Schneck, 1994, p. 644; Becker, 1998, p. 140; Haertsch, 2000, p. 46]

This classification is depicted in figure 2. The corporate strategy is the general frame for the strategy of subordinated business units (business strategies), while individual business strategies are anew the frame for detailed functional area

strategies on the rather operational level. This hierarchy combined with decreasing granularity of objectives towards lower levels of strategy ensures that the overall objectives on the corporate level can be achieved.

Besides different classifications, various definitions of strategy can be found in literature. Porter, as a prominent example, defines strategy as "the creation of a unique and valuable position, involving a different set of activities. If there were only one ideal position, there would be no need for strategy" [Porter, 1996]. Strategy is creation of a position. It is connected with activities that are aligned to common objectives. Porter also stresses that there exists no ideal or single generic strategy that fits to every situation (contingency theory).

Tactical/Operational Plan

The word 'tactics' has its origin in the Greek word 'taxis', which describes a military formation, led by a 'strategus'. Once decided, the military strategy directs tactics, the use of weapons in battle [Stark, 2005, p. 131]. Furthermore, the *Oxford English Dictionary* gives two definitions of a plan [Stark, 2005, pp. 130-131]. One roughly is the description of a map, a graphical display of relations of a set of objects in time, place etc. The other defines a plan as "A formulated or organised method according to which something is to be done; a scheme of action, project design, the way in which it is proposed to carry out some proceedings" [Stark, 2005, pp. 131-132].

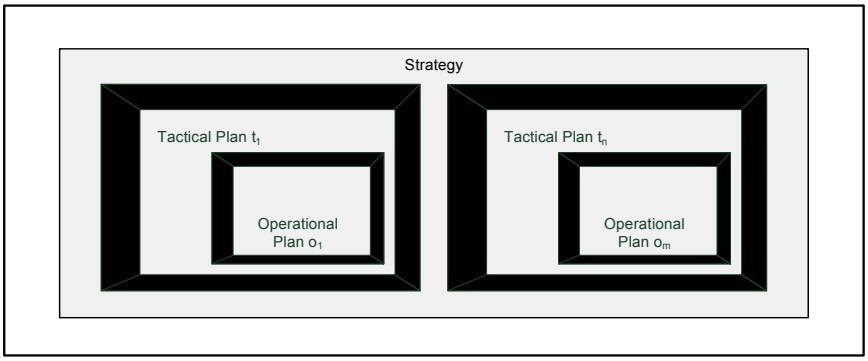

Figure 3. The Relationship of Strategy and Plan

Based on the general characteristics of strategic, tactical and operational planning [e.g. Schneck, 1994, p. 643], two types of plans are differentiated here: the tactical plan and the operational plan. The operational plan is more detailed than a tactical plan, its granularity is lower, or its complexity, its account of the details is

higher than those of a tactical plan. Finally, the relationship of strategy and plan is depicted in figure 3. Every single 'broad-brush' strategy can encompass several focused tactical plans [e.g. Gorchels, 2003, pp. 41-45], and tactical implementation plans can encompass several detailed operational plans.

The Relationships between the Single Terms (Master Plan)

Stark gives a good overview of how the last five terms are related to each other. The order proposed here is mission>vision>objectives>strategy>plan>implementation. Stark's overview is quoted in the following:

> "The mission is at the highest level. It's the special task or purpose of a company. It describes the purpose of a company but doesn't say what has to be achieved to carry out this task is or how it will be achieved. The objectives are closely linked to the mission. They express at a high level what must be achieved to carry out the mission. The strategy describes the way to achieve the objectives. It defines how resources will be organised. It defines the policies that will apply for the management and use of resources. After the strategy comes the plan. Once the strategy has been defined, it's possible to start planning detailed activities and resources. After the plan comes the implementation."[3]

Finally, the relationship between vision and strategy needs to be clarified (see figure 4). In Stark's words again, "A vision describes the future state of something, so it's very different from a strategy which describes the way to achieve objectives". [Stark, 2005, p. 130]. In an abstract sense, a strategy can therefore be seen as the top-level activity, while a vision is the target state that is to be reached with the strategy. With the objectives suitable for reaching the target state, implementation plans are elaborated and carried out.

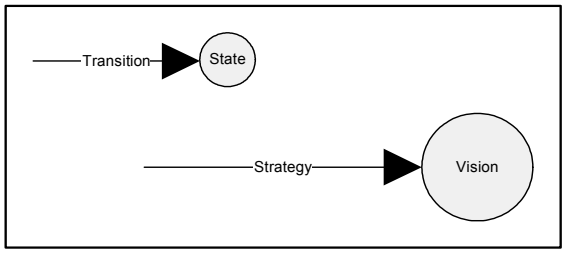

Figure 4. The Relationship of Vision and Strategy

[3] [Stark, 2005, pp. 132-133]; Stark proposed the order mission>objectives>vision>strategy>plan

2.2 Strategic Options

The goal of corporate strategy is a balanced portfolio of independent strategic business units to achieve sustainable competitive advantage [Brack, 2003, p. 61]. "Corporate strategy is what makes the corporate whole add up to more than the sum of its business unit parts", states Porter in his article *From competitive advantage to corporate strategy* [1988].

Corporate Strategy Options

In the 1980s, Porter formulated the widely regarded generic options for corporate strategies in arbitrary industries. Based on the preliminary analysis of structure and competition in a specific industry, the strategic options are namely cost leadership, differentiation and niche focus.

The strategy of cost leadership has the objective of sustaining the lowest cost structure in the industry, whereas a differentiation strategy focuses on unique or additional value creation for the customer [Haertsch, 2000, pp. 75-76; Porter, 1980]. To avoid price competition, this value needs to be significantly different from the value competitors provide. Then, differentiators usually are able to charge higher prices for their products. While there can only be one cost leader at one point in time in a certain industry, there can be several differentiators concurrently in one industry. Cost leaders and differentiators both target the core or mass market. A third option identified by Porter is the niche strategy, e.g. focusing a regional or product niche. A company pursuing a niche strategy, either based on cost leadership or differentiation, targets smaller parts of a core market, to serve the customers in these niches better or cheaper than competitors that have a broader market focus.

These four options are the basic options for corporate strategy. The classical assumption by Porter is that the strategies are exclusive, e.g. that a company cannot pursue a cost leadership and differentiation strategy at the same time without being stuck in the middle, in a mediocre and less valuable position. In order to sustain a "unique and valuable position" [Porter, 1996], one of these strategy options needs to be selected.

The Business Unit

In Porter's definition, a strategy not only is a position, but also involves a "different set of activities" [Porter, 1996]. The company's core activities are usually carried out

in independent business units, based on tactical and operational plans (see figure 2 and 3). Therefore, the business unit is the most important organizational level for strategic, tactical and operational considerations, because competitive advantage can only be achieved on the business unit level [Haertsch, 2000, pp. 45-46]. "*Competition occurs at the business unit level*. Diversified companies do not compete; only their business units do" [Porter, 1988]. The business unit hence is the place where the 'tactics' in its rather original sense as well as resources are led to formation, trained and improved for the 'battle of market share'.

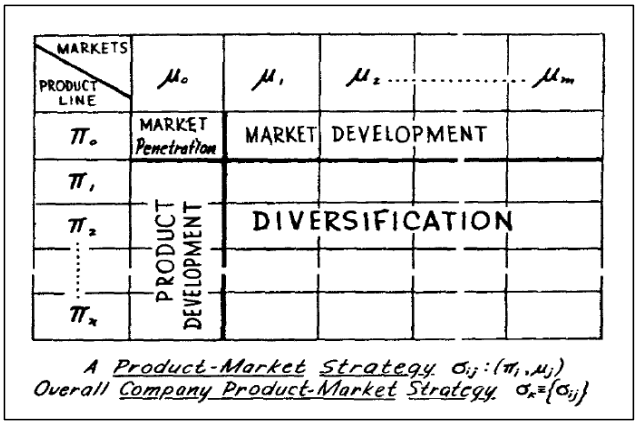

Figure 5. Product-Market Strategies for Business Growth Alternatives [Ansoff, 1958, p. 394]

In his article *A Model for Diversification*, Ansoff [1958] describes four product-market strategies for business or market share growth based on the product-market matrix depicted in figure 5: Market penetration (increase volume of sales to present or new customers while maintaining original product-market strategy), Market development (adapt present product line to new market), Product development (development of new product for present market) and Diversification (new product line for new market).

Diversification and product development depend directly on (product) innovation, and market penetration and market development depend on marketing innovation or more generally adaption (to customer's needs, to the market). "In effect, Ansoff's growth vectors are determined by the two basic forces of supply and demand, or technology and customers" [Baker and Hart, 1999, p. 27]. A reduction of Ansoff's original decision matrix to a decision between adaption and innovation leads to a model of the eight basic options for a competition-oriented business strategy.

Options for a Competition-Oriented Business Strategy

The model depicted in figure 6 is clearly a synthesis of Porter's and Ansoff's approaches to business strategy. This model visualizes the basic strategic options for a business unit. Steinmann and Schreyögg [1990] identified three binary attributes of a competition-oriented business strategy: Focus of competition (f_i: cost or differentiation), Location (l_j: niche or core market) and Rules (r_k: adaption or innovation). The resulting eight basic attribute triples (f_i, l_j, r_k) can serve as general guidelines for developing a specific business unit strategy. Focus and location may be roughly determined by a given corporate strategy, but the shaping of competition rules falls within in the responsibility of each single business unit.

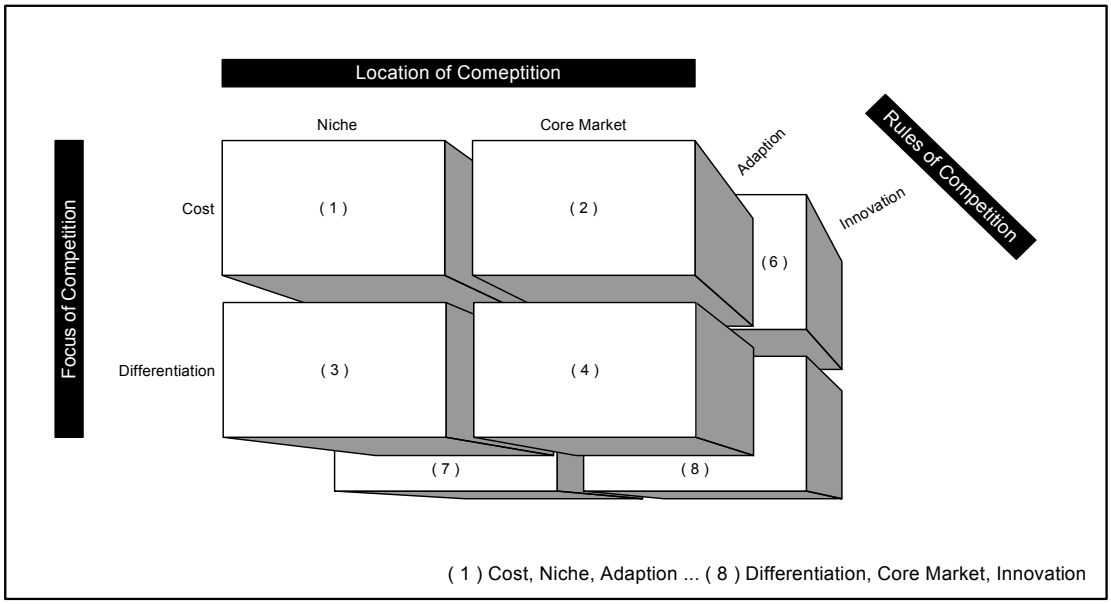

Figure 6. The Eight Basic Options for a Competition-Oriented Business Strategy [Steinmann and Schreyögg, 1990][4]

Finally, some opinions about advantages and disadvantages of business strategies in the information industry are collected. In their almost classical book *Information Rules*, Shapiro and Varian explain that a differentiated product market is "the most common market structure for information goods; the publishing, film, television, and some software markets fit this model" [1999, p. 25]. Haertsch [2000, pp. 133-134] expresses that in the global digital economy, low costs are more and more a prerequisite of competitiveness. Therefore, in electronic commerce, rather few

[4] Taken from [Marr and Picot, 1991, p. 673] and translated from German.

companies pursue a cost leadership strategy. A differentiation strategy is hence preferred. Haertsch quotes two German and American empirical studies from 1998 that support this opinion. Similarly, based on broad international and US studies, Cooper concludes in his book *Winning at New Product* that one strategy – namely differentiation – "yields exceptional performance results" [Cooper, 2001, pp. 366-367]. Similar to Haertsch, Brack questions if for media markets, a strategy of cost leadership is still appropriate in times of individualization and one-to-one marketing [Brack, 2003, p. 65]. In the light of Porter's statement that there can only be one cost leader, but many differentiators in an industry, as e.g. quoted by Haertsch [2000, pp. 75-76; Porter, 1980], these opinions and results are hardly surprising.

In her detailed analysis of German and global media enterprises, Sjurts states that the media industry is focused on mass markets rather than niches ("mass preferred to quality") [2002, pp. 14-15]. Her analysis reveals the dominance of differentiation strategies in this industry [Sjurts, 2002, p. 91, p. 172, p. 236, p. 303, p. 393]. A preference of innovation or adaption is not to be clearly derived from these results. Sjurts counts 12 companies in the sample with an orientation towards adaption, against 19 companies with an orientation towards innovation. All 7 global media enterprises in the sample seem to pursue an overall innovation-oriented business strategy [2002, p. 393]. However, Sjurts' results are condensed into one single corporate strategy, single business units within a company may pursue different strategies. Additionally, some companies in the sample may in reality pursue hybrid strategies, or no clear strategy at all.

2.3 Hybrid Decisions

A strategy that equally and simultaneously focuses on n aspects of a decision model, even when some authority recommends a choice out of n strategies to achieve a competitive advantage, can be named a hybrid competition-oriented strategy.[5]

Hybrid Strategies

As a hybrid corporate strategy is pursued, no focus on either cost or differentiation is set, but both aspects are taken into consideration simultaneously. Hybrid strategies in

[5] Roughly based on [CeDiS, 2003]: definition of a hybrid corporate strategy (in German).

general question the basic assumption that n-dimensional strategic options of decision models like the one depicted in figure 6 are exclusive. Mass customization is often named as a hybrid strategy [e.g. Piller, 2003, pp. 211-222; CeDiS, 2003].

Especially for digital information products, the simultaneous pursuit of cost saving and differentiation is possible, as information and communication technology allows for operational automation while possibly increasing the useful complexity of the product, i.e. product effectiveness can be increased while process efficiency is increased simultaneously. However, there is certainly no simple straightforward relationship like 'ICT always saves costs and raises possible differentiation'.

Berthon, Hulbert and Pitt [1999], discussing the classical choice between business units' orientation towards innovation or adaption, presented an approach that may be able to clarify the conflict between choice and hybrid strategy using simple trade-offs. This, together with simultaneous and sequential hybrid strategies is further discussed in chapter 5.1.

Decision Models

Like every model, the model depicted in figure 6 is an abstraction of reality. The primary purpose of this model is to provide guidelines for developing a specific strategy, built on past experience and best practices. Simple models can never explain the real world in its total complexity, which is inherent to the whole process of model building. Decision models rather provide guidelines for a purposeful reduction of complexity, in order to make a decision which otherwise would hardly be possible. They are not complete, and they will never be, as a complete model would comprise the complexity of the real word and therefore would be useless for the purpose of decision-making. There is no such thing like a perfect model, and there will never be one. However, decision models can be purposeful and useful, especially if they are built on theoretical or empirical foundations.

The purpose of Porter's, Ansoff's as well as Steinmann and Schreyögg's models is to enable a business unit to find a clear strategy. For this purpose, they are useful. However, these models are not intended to explain reality. For example, companies that don't pursue a clear strategy at all cannot be mapped easily into Porter's rational model, which in fact they never applied. Decision models are prescriptive or normative models; therefore they can be used for descriptive purposes only with caution.

3 The Product Lifecycle

The product lifecycle is a well-known concept that arose from both natural sciences and marketing theory. Stark pictorially compares it with the lifecycle of man: “There is nothing new in a lifecycle. Shakespeare described a lifecycle hundreds of years ago when he wrote of the seven ages of man (the infant, schoolboy, the lover, a soldier, the justice, the lean and slippered pantaloon, second childhood)” [2005, p. 17].

The product lifecycle concept was the subject of considerable research in the 1960s. One of the leading researchers in this field, Robert D. Buzzell, defined the product lifecycle as “a generalized model of the sales trend for a product class or category over a period of time, and of related changes in competitive behavior” [1966, p. 50]. The lifecycle visualizes the need for strategy change, especially product strategy change on the operational level, at different stages in the life of a product. Unlike biological life forms, products can be revitalized at the peak of their maturity by the application of imagination and logic, preventing the decline caused by more adapted, more innovative competitive products and leading to either an equilibrium (extended maturity) or even a new growth phase [Baker and Hart, 1999, pp. 19-22].

Much effort has been undertaken to use the lifecycle for predictive purposes, but the main hindrance is that the length of each stage can only be established a posteriori [Baker and Hart, 1999, pp. 20-21]. For individual members of a species, the length of each phase can be estimated, e.g. human beings complete the cycle in approximately 70-80 years. For new products however, the length of the lifecycle and each stage may vary between a few months and decades [Ansoff and Stewart, 1968]. The true value of the model hence lies in the clear visualization of the need for continuous product innovation and marketing activities throughout the lifecycle, describing the evolution of successful products, product lines or platforms over time.

3.1 The Seven Stages of the Product Lifecycle

The classical product lifecycle is a four-stage model of the sales trend, starting with market launch and ending with the decline and retirement of the then mature products, showing the typical skewed normal distribution depicted in figure 7. Here, an extended model is introduced that additionally takes the development of new products (the pre-launch stages) into account. Before any sales revenues can be generated with fresh products, high fixed development costs accumulate at these early stages, and new product success rates are often low[6].

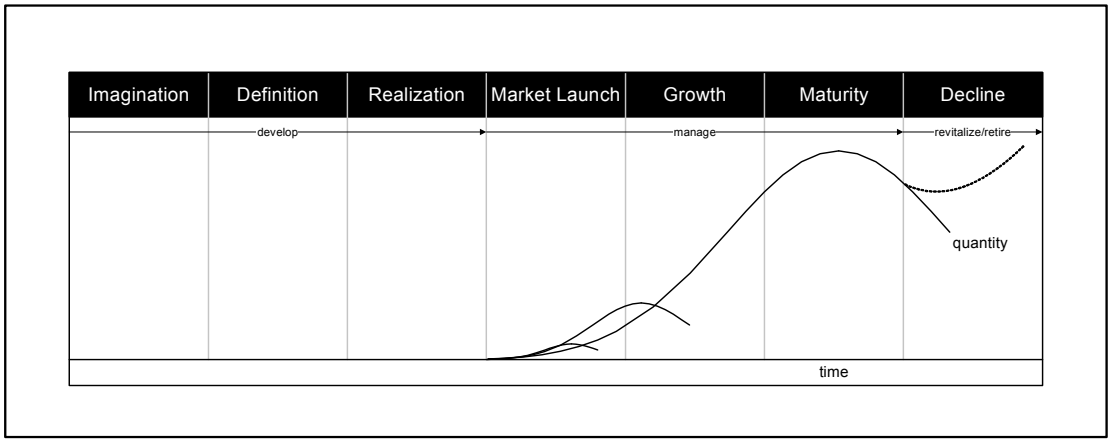

Figure 7. The Seven Stages of the Product Lifecycle
[based on Baker and Hart, 1999, p. 22; Cooper, 2001, p. 130; Stark, 2005, p. 17]

However, if a new or improved product makes it to the market launch and is successful at this stage, it is likely to experience a period of rapid growth, until it finally reaches maturity with decelerating growth and soon thereafter starts to decline [Baker and Hart, 1999, p. 19], if no further investments are made. Due to the high failure rates of new products, these fairly few successful products need to be managed carefully and revitalized at later stages, if appropriate in the individual case.

[6] The rates of successful market launch vary from 100 down to 0 percent for individual companies. Various studies show different results for new product failure and come to average failure rates between 35 and 90 percent, depending among others on the industry, on the definition of 'failure' and 'new product' and if the large numbers of projects that are aborted in the pre-launch stages are considered or not [Cooper, 2001, pp.10-12]. For the music industry, Brack states that not more than 25 percent of all projects are successful [2003, p. 23].

New Product Development

New product development (NPD) is one main source of innovation for a company. Without innovation and new products, company revenues will decline [Stark, 2005, p. 15]. The development process can be implemented as either a more traditional, sequential process like Cooper's Stage-Gate approach [Cooper, 2001] with alternating phases and reviews; or as a concurrent, integrated and more unstructured, therefore possibly faster and more 'creative' process. However, the lack of a structured process of any kind "leaves product development in shambles" [Anderson, 1996, p. 30].

Every product is born as an idea, based on an invention, a need, a dream or something similar, what is called imagination here. Several ideas may be generated, and some may be selected for realization in a screening process. The product then is defined, e.g. its features are fixed and an initial business model and marketing plans are developed. After the definition comes the realization, where the products as a whole or its individual parts and modules are implemented and tested. The final market launch stage is the interface to product management, though in practice there may be no strict delimitation of new product development and product management.

Product Management

Product management (PM) is mainly concerned with the classical lifecycle from launch to retirement. Even after a successful launch, the evolution of most products does not stop. Product innovation, both of existing and new ones, and product support, i.e. the coordination of production, distribution, marketing, sales and after-sales service therefore are the objectives of product management [Köhler, 2005, p. 64]. During the different stages in the lifecycle, continuous review of operational strategic options like the marketing-mix (product, promotion, pricing and distribution) may be helpful to ensure a steady growth of product sales.

For the launch stage, Morse [1998, pp. 93-96] proposes a main strategy that aims at getting innovators who are willing to pay a high price to try the product, using vast advertising, samples and test-drives. For the growth stage, a wider market should be targeted while keeping prices up, to take advantage of the market growth and catch the early adopters. Strategies for mature products need to deal with increasing competition. Morse recommends a differentiation strategy to avoid price competition; in combination with further adaption to customers' needs, this becomes a moderate cash cow strategy for late adopters, targeted at the mass market.

Revitalization and Retirement

Few products in practice show the smooth sales cycle as depicted in figure 7 [Handscombe, 1989, pp. 46-47; Baker and Hart, 1999, pp. 116-119]. Many products fail or decline early. When sales decline, the aim therefore is to achieve a further series of growth/equilibrium sub cycles by applying revitalization strategies for mature products, to delay the inevitable end of product life [Baker and Hart, 1999, p. 19] and avoid the need to treat products as cash cows prior to early retirement.

A successful revitalization marks the beginning of a new growth cycle [Baker and Hart, 1999, p. 22], as indicated by the dotted line in figure 7. But since product life cycles are no independent phenomena, they need to be seen as a series of cycles within the long-term cumulative market cycle [Handscombe, 1989, p. 47], and in the end, because of reasons like technological obsolescence and increasing competition through similar products, decreasing prices and profit margins, products need to be retired. Nevertheless, product retirement should be the result of a structured plan implementation, following an objective problem analysis, because "Winning companies retire their own products rather than let competitors do it for them" [Meyer and Utterback, 1993, p. 46].

3.2 Criticisms of the Concept

The weakness of the product lifecycle concept is that "the misguided seek to use it as a predictive device when, by definition, one can only establish the length of each phase of the life cycle after the event – a posteriori" [Baker and Hart, 1999, pp. 20-21]. The product lifecycle should therefore not be used as a predictive tool, but rather as an analytical framework when managing existing products [Baker and Hart, 1999, p. 110]. Marr and Picot [1991, p. 665] summarize some further criticisms:

- Prediction of the appearance of the lifecycle for an actual product may be difficult, especially if it is a mature product with potential for further market penetration or market development.
- Cyclical movements in the market and other external factors like imitators or new market entrants may influence the lifecycle.

- The simple causes-consequences relationship between time and sales trend with sales being the dependent variable may not be the whole truth in reality [see also Onkvisit and Shaw, 1986, pp. 51-52].

Despite these difficulties, Marr and Picot conclude that an approximate determination of the current stage for a product should be possible. Findings can then be used to develop strategies for future investment and marketing. Over and above that, it is believed here that a business unit's orientation towards innovation or adaption can be roughly derived from the stage the majority of its products has reached, as there is one point in the lifecycle of products that can easily be determined: the peak of maturity, when the sales trend starts to decline, and the decision about revitalization or retirement becomes imminent. This is the latest point in time where a shift towards customer orientation can be realized, as it will be discussed later.

Furthermore, Marr and Picot already in 1991 signaled the importance of product lifecycle management (PLM), the integrated management of a balanced portfolio of products at different stages in their lifecycle [Marr and Picot, 1991, p. 665; Baker and Hart, 1999, pp. 126-127; Stark, 2005, p. 15]. Too many young products (question marks) increase financial and growth risks for a company, while too many mature products (cash cows) endanger its future existence[7].

3.3 Product Lifecycle and Supply Chain Management

"Product management is about innovation", states Handscombe [1989, p. 47], which might only be half the truth, as product management and therefore the product lifecycle concept may also be about adaption. Product management in broader view can be called product lifecycle management, the integrated management of a balanced product portfolio. Product management can be sorted in at the operational level of product strategy, dealing with one single product, product line or product platform. The higher level is the business strategy, dealing with a complete portfolio of products. Like the goal of corporate strategy is a balanced portfolio of business units,

[7] For details about portfolio approaches like the Boston Consulting Group (BCG) Matrix, see for example [Handscombe, 1989, pp. 47-49], [Baker and Hart, 1999, pp. 126-147] or [Haertsch, 2000, pp. 50-52].

the goal of business strategy is a balanced portfolio of products, preferably at similar stages in their lifecycle (see also chapter 9.1).

Porter's supply chain concept is another concept from the operational level of organizational hierarchy. However, similar to product lifecycle management, supply chain management (SCM), the management of the supply chain, is a business unit task [Cronin, 2000, p. 22]. Only the business unit has the competence and power to manage the supply chain as a whole.

Christopher [1998] defines supply chain management as "the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole". It is argued here that managing the supply chain and products' lifecycles simultaneously at the business unit level can contribute to the definition of a broad business strategy, like for example proposed by Kopczak and Johnson [2003, p. 29]. The product lifecycle emphasizes a product view, takes product innovation and effectiveness into account and therefore deals with sustainable, future success. On the other hand, the supply chain enforces a process view [Piller, 2003, p. 109], takes process innovation and process efficiency into account, and mainly deals with present success during everyday production of goods and services.

When Hass describes the three components of a business model [2002, pp. 89-91], product architecture (product view), supply chain or value chain structure (process view), and revenue model (market or marketing view), the strategic importance of separate consideration of product and process views is supported. In the light of previous discussed thoughts, Meyer and Zack's model of the architecture of information products [1996, p. 47] is suitable to visualize the strong interdependencies of both yet distinctive views (see figure 8).

The upper part of the figure represents the product view. Meyer and Zack propose a repository to store content and structure of products (the product platform). This repository is the base for different information products of a company, categorized into different product families or product lines. The lower part depicts the supply chain view (the process platform), the process that starts with information production and ends with information consumption, where value is created or added along the chain.

The product lifecycle as an analytical framework contributes one very important factor to the observation of products and processes: time. Incremental

innovation or evolution is the force that works permanently in the background, as products and processes evolve over time. A company of which products and processes don't evolve may soon face competitors with more efficient processes and evolved products that compete with its own offerings.

The product lifecycle concept is dynamic by definition; the supply chain however is a static concept by definition. Nevertheless, processes underlie changes over time. As an example, a newly released product may have a fairly simple supply chain structure with only a few information suppliers. As the product becomes more sophisticated over time, as it matures, the supply chain is likely to evolve in a similar way. A mature product then often has a complex process structure, various suppliers that need to be coordinated, a supply chain that may have evolved into a wide supplier network, various parallel internal processes that need to be managed, and customers that expect the product to be adaptive, personal and easy adjustable to their individual needs. Therefore, a company that doesn't see evolution and innovation of its products and processes as a part of its strategy may fall behind competitors easily.

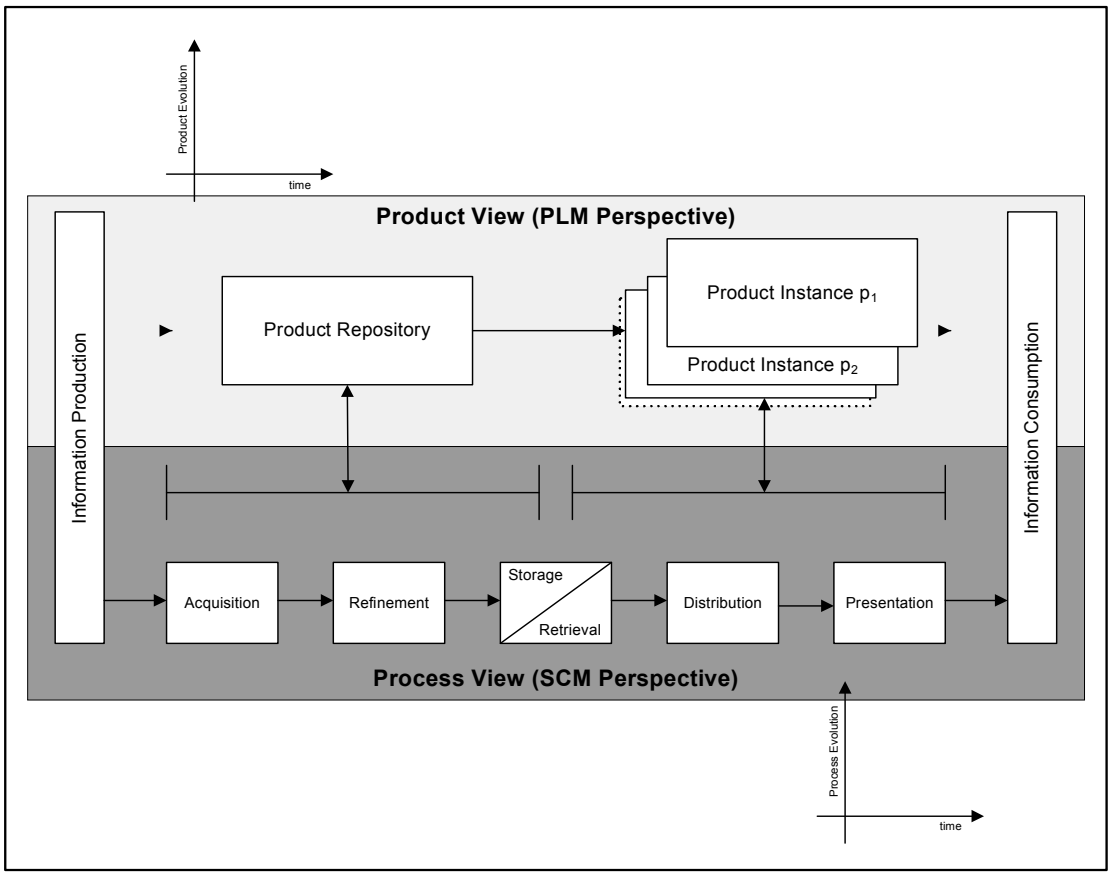

Figure 8. Evolution of Information Products and Processes [based on Zack, 1996, p. 77; Meyer and Zack, 1996, p. 47; Kopczak and Johnson, 2003, p. 29]

4 Information Products

Different authors focus on different details of information products. Kilpi, starting from Kotler's general definition of a product[8], names three components of software products: the software (information), the belonging support service, and the idea behind the product [1997, p.166]. This broad view of information products and their environment is supplemented by Hass, who defines media or information products as marketable products or services that can be decomposed into a technology-based media layer and a virtual information layer [2002, pp. 17-18], based on Negroponte's analogical differentiation of 'bits' and 'atoms' in physical information products and vision of all media being digital in the future [Negroponte, 1995, pp. 11-20]. This 2-layer model is especially useful to understand phenomena like the ongoing desintegration of media and information, and media convergence.

Desintegration enables companies to store digital information and content in media-independent form in central repositories during production, and to reintegrate information from multiple sources with different media types to create manifold information products distributed over different channels afterwards. This makes cost-efficient multi-usage of valuable information possible and drives convergence of different media types, while companies can exploit economies of scope. Opportunities for completely new business models emerge, like for example: radio and television on the Web; electronic books; up-to-date virus signatures and software updates regularly distributed via Internet to thousands of decentralized computers all over the world; the same news disseminated via radio, television, newspapers, periodicals, interactive Internet portals, Web services, really simple syndication (RSS) feeds or electronic ink

[8] Kotler, P. (1997) *Marketing Management: Analysis, Planning, Implementation, and Control*. Upper Saddle River: Prentice Hall, 1-107

devices; video-on-demand, electively over satellite, broadband Internet, videotape or digital versatile disc (DVD) mailings, in addition to the traditional pickup of data media by the customer at the local video store, to name just a few.

Sophie Schweizer introduces a three-layer model of information products [Schweizer, 2003, pp. 20-23] by dividing the information layer into an inner core of information and a surrounding layer of style, the inner form. The information layer is surrounded by the technology-based media layer, the outer form. This model is depicted in the following:

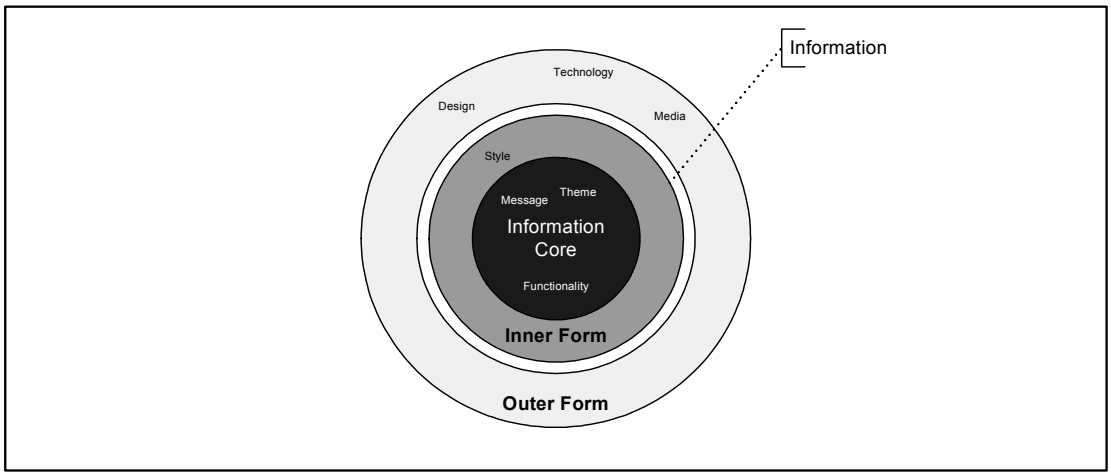

Figure 9. A Model of the Information Product [adapted from Schweizer, 2003, p. 22]

Technology defines *what* is possible, while style broadly defines *how* something is said or done [Schweizer, 2003, pp. 27-29]. The information core is the basic value of the information product, transporting the theme or message and possibly providing certain functionality. Against the background of innovation, the model provides three starting points for information product innovation: functional innovation, stylistic innovation, and technological innovation. Stylistic innovation has special importance for media products, as it is "a means of creating value by differentiation" [Schweizer, 2003, p. 28]. But also for other types of information products like software, e.g. the style of interaction, the behavior of the application under normal and error conditions, and usability in general may be a starting point for differentiation and adaption strategies. Stylistic innovation itself may influence both the inner as well as the outer form of an information product, i.e. the style as well as the design of the product. Technological innovation again may influence and shape the inner form as well as the core of the information product.

4.1 Common Characteristics

An information product has an inner and an outer form surrounding its core, and especially complex information products with need for explanation may require complementary support services for e.g. further customization, adaption, maintenance or error recovery. In the next place, information products have specific characteristics that distinguish them from purely physical products. The most distinctive characteristic of information products when compared to physical products is the immateriality of information, the core of information products. Information products therefore are partly immaterial. Unfortunately, they are still subjected to the limitations of the physical world, because information needs a medium to exist. Without a physical medium of any kind, any information instantly vanishes.

Media Dependency and Timeliness

Information is bound to a physical medium. This is one of the reasons why management of the supply chain and operative logistics are as important for information products as for physical products. Even when transferring pure information over a computer network, a vast infrastructure is working in the background. It is not obvious when using a machine connected to a network like the Internet, but everything from the beginning to the end of this network is still physical, and as this infrastructure has to be built and maintained, access is usually not free of charge. Cremer and Laffont thus define information products as “excludable public goods with a private access cost” [Cremer and Laffont, 2003], because information is basically a public (nonrival) good, but media most often are private goods. Furthermore, the ‘look-and-feel’ of an information product depends on its outer form. A compact disc (CD) with music differs significantly from raw MP3 files on a computer, and a tangible book has a different handling than an electronic book, even though the core of both products is the same. Many may argue that a tangible information product delivers more value than the digital form, therefore pricing should be different, according to the differing value perceived by the customers [Choi, Stahl and Whinston, 1997, p. 65; Shapiro and Varian, 1999, pp. 3-4].

Many information products are also time-dependent [Choi, Stahl and Whinston, 1997, pp. 65-66; Freiden et al., 1998, p. 216; Shapiro and Varian, 1999, pp.

56-57; Rowley, 2002, p. 353], as they loose value over time, and different information has different lifecycles. This is one of the reasons why product lifecycle management is important for information products. Some information like news and stock prices become obsolete within a few days, and most of the music produced today never gets a significant audience to be profitable, even though some of this information may be of value and can be revitalized or reused decades after is has been published, news for example in documentary films, music for example as part of an album with early works of a then popular band. Fashion, lack of popularity and cognitive or technological advances may be other drivers for obsolescence of information products. A company that actively manages lifecycles can also artificially create time dependence for otherwise durable or time-independent information products, like it is done in the software industry with frequent version updates and retirement of older versions plus abandonment of support services to facilitate sales of newer versions of the software [Choi, Stahl and Whinston, 1997, pp. 78-80].

High Fixed Costs

The production of information is usually connected with high fixed costs, as this is often a ‘creative’ and collaborative manual process of human agents like artists or highly-skilled specialists that can only be partly automated [Choi, Stahl and Whinston, 1997, p. 66; Hass, 2002, pp. 46-47]. An example may be the production of a motion picture or the production of complex standard software. The high fixed costs or ‘sunk costs’ contrast with relatively low variable cost for the reproduction of finished information products. Reproduction costs only depend on the used media and copy technology [Hass, 2002, p. 45], as information is immaterial. Because average total costs decrease with increasing output quantity, economies of scale play an important role when working on information production. Besides production costs, marketing effort is another weighty fixed cost pool for information products [Hass, 2002, pp. 46-47].

Marketability and Copyability

Information products can be copied, shared, resold or rented [Varian, 2000, p. 473]. Rowley adds that information itself can also be transferred between different media, and that “it can be packaged in many different forms” [Rowley, 2002, p. 353], which essentially is the same as copying an information product or a part of it. While selling

and renting of information products on digital or physical markets enables companies to create revenues, sharing, copying and reselling are activities that are mostly beneficial to customers. Copyright infringements and piracy are illegal but serious threats for information companies. Additionally, customers reselling durable used information products can further diminish companies' profits [Choi, Stahl and Whinston, 1997, p. 72], though reselling of information products and sharing or copying for private or educational purposes are legal activities in most countries.

Network and Lock-In Effects

Often, the value of an information product depends on how many other users there are [Choi, Stahl and Whinston, 1997, pp. 66-68; Shapiro and Varian, 1999, pp. 11-17; Hass, 2002, pp. 48-53]. For example, the value of instant messaging software depends on how many other users are on the network for talks. Therefore, instant messaging software exhibits direct and positive network effects, this means that demand for this software goes up with the installed base. Indirect network effects exist when there is only a virtual network, like the value of a CD as a data medium is raised when many user possess a CD player, leading to mass production of CDs and possibly falling prices, which again gives positive feedback to the virtual network of CD users. Positive feedback often leads to exponential growth after a certain threshold has been reached [Hass, 2002, pp. 50-51]. However, negative feedback can also exist and is important in competitive environments. For example, the growing usage of CDs gave a negative feedback to the usage of audiotapes as data medium, leading to decreasing demand and higher prices for audiotapes, which again gave negative feedback to overall audiotape usage. In connection with competing technological standards, network effects therefore play an important role.

Marketing tools such as advertising and penetration pricing may be helpful to ignite a positive feedback [Shapiro and Varian, 1999, pp. 11-14]. Furthermore, the power of 'social network effects' should not be underestimated, as satisfied customers often promote a product on their own free will because of the value it provides to them. Mobile phone providers for this reason often offer discounts for calls within their own mobile network.

Lock-in effects are closely connected with network effects, as network effects are a common source of switching costs [Shapiro and Varian, 1999, pp. 46-47]. One of the reasons why DVD players nowadays are enjoying growing popularity is that

they are downwards compatible and can also play CDs, therefore switching costs from CD technology to DVD technology are low, while DVDs provide a higher value like higher possible storage capacity at the same time. Compatibility to existing standards and low switching costs can therefore increase the competitive advantage of new information products. On the opposite side, customization and personalization are strategic means to significantly raise switching costs and create lock-in effects in order to chain customers to existing or mature product. An extreme example may be enterprise resource planning (ERP) software that sometimes needs years to be fully adapted to a company's processes, and once it is in use, it may take even more time to replace it with software from a competing vendor.

4.2 Experience Goods

In his article *Economic Welfare and the Allocation of Resources for Invention*, Arrow described the information paradox that occurs when customers want to evaluate the value of certain information before consumption:

> "[…] there is a fundamental paradox in the determination of demand for information; its value for the purchaser is not known until he has the information; but then he has in effect acquired it without cost. Of course, if the seller can retain property rights in the use of information, there would be no problem, but given complete appropriability, the potential buyer will base his decision to purchase on less than optimal criteria. He may act, for example, on the average value of information in that class as revealed by past experiences."[9]

Basically, information products are experience goods. In other words, customers must experience the products before any value accrues to the individual or corporate customer [e.g. Choi, Stahl and Whinston, 1997, p. 138; Shapiro and Varian, 1999, p. 5]. Many new products are experience goods. Search goods on the other hand are products "with characteristics that enable an individual to evaluate the product's quality in advance of an purchase" [VanHoose, 2003, p. 178].

However, in contrast to the information paradox, some information still provides value to the customer even after the first inspection. Hass gives the example of entertainment products [2002, pp. 55-56]. Having watched a movie at the cinema,

[9] [Arrow, 1962, p. 615]

hence knowing the information, one may still want to purchase this movie on DVD for repeated usage. Deeper exploration of high-quality entertainment products is often a significant part of customer's value experience, what Vorderer, Klimmt and Ritterfeld call 'entertainment experience' with a core of enjoyment [2004, p. 393]. Shapiro and Varian state that especially young children watch movies they like over and over again, "and every parent quickly learns the value of owning popular kid vids rather than making daily trips to the rental store" [1999, pp. 48-49]. This implies that quality (as a necessary precondition of popularity) is one of the most important factors that determine if reusable experience goods are actually reused.

Making Experience Goods Searchable

In order to ease the customers' a priori decision about quality of an experience good, some of the product characteristics need to be exposed in public. The aim is to reduce uncertainty to a level at which customers can be more easily convinced to buy the product. Companies can for example use some of the following possibilities to increase customers' trust in new or unknown products[10]:

- Informational marketing can increase customers' knowledge about true product features and quality.
- Free samples and limited test-drives ('try before buy') can give a preview of the overall quality of an information product.
- Providing extended guarantees and warranties can raise customers' trust in the company and in the quality of its products.
- Several companies together can establish industry standards, quantitative or qualitative criteria that products should satisfy to merit a positive buying decision by customers.
- Third-party certification and awards can signal product quality.
- Building a reputation or brand names can help to distinguish company's products from competitive products and helps generate repeat purchases.

Against the background of the economic lemon problem, the described possibilities can be applied by companies that are selling high-quality products in

[10] For the most parts based on VanHoose's propositions [VanHoose, 2003, pp.136-138]

order to make the market more transparent. Without market transparency, adverse selection due to declining market prices, due to a superior number of low-quality products (lemons) in the market could lead to a state where only sellers of low-quality products with lower production costs remain in the market [Choi, Stahl and Whinston, 1997, pp. 139-145]. Additionally, lemon sellers can use persuasive marketing and try to mask the low quality of the products with inappropriate high prices to give the appearance of high quality, without giving any true information about the real quality of the products in advance [VanHoose, 2003, pp. 181-190 and Choi, Stahl and Whinston, 1997, pp. 141-143]. Smart customers may avoid the market then after some bad experiences together with the high-quality vendors. Therefore, a company that rents or sells quality products has a natural interest in informing customers about the true quality of its products, hence providing a value experience not only after the purchase, but also before and during economic transactions (see also chapter 7.3). This chapter can be summarized with the words from Choi, Stahl and Whinston, who state that "sellers of information products need to provide stronger evidence of their guarantee or trustworthiness to customers than do sellers of non-digital products" [1997, p. 68]. Trust is important because information products are experience goods.

4.3 Being Digital or Not

Information is immaterial and digitizable. Every information product with a core of information can be digitized [Shapiro and Varian, 1999, p. 3; Choi, Stahl and Whinston, 1997, p. 62]. Digitalization means storing information in bits, the smallest information unit, representing one of two distinctive states: on and off, 1 and 0, or black and white [e.g. Negroponte, 1995, pp. 14-17]. Even if an exact distinction does not seem to be reasonable, a digital information product is a product with a digital information core, whereas an information product in general is a product with a core of digitizable but not necessarily digital information. Boundaries are sometimes blurry, as for example a barcode printed on a white paper is definitely information, it is digital information as the code already represents a series of bits, but is the whole paper a digital or non-digital product? A clear answer cannot be given. Even if the product has a digital information core, a piece of paper with some information on it would usually be called a non-digital and analog product respectively. Information is only digitized for that it can be processed with current information and

communication technology (ICT), and being digital is rather a convention or standard than a natural law. The digital numbering system is based on the number 2, but information can also be coded based on the numbers 8, 42 or 35935454323957, or any other arbitrary number.

Choi, Stahl and Whinston name three characteristics of digital information products: indestructibility, transmutability and reproducibility [Choi, Stahl and Whinston, 1997, p. 69-74].

Digital information products are surely destructible. Everyone who ever experienced a head crash of a hard drive or accidentally poured a cup of coffee over his personal digital assistant (PDA) would surely agree. Mankind will hopefully not find out how much digital information can be destructed within seconds by a few atomic bombs for example, as nothing that is rooted in the physical world is indestructible. What Choi, Stahl and Whinston really mean is that digital information like information in general doesn't suffer from usage. A book as a physical medium underlies wear and tear; digital information does not[11]. However, a hard drive as a carrier medium underlies wear and tear, with the difference that it either works, or it is defect; it is on, or off. To keep on with this, books exist that are over thousand years old and are still readable, computers only exist since a few decades. No one up to now knows how long digital information stays intact on a CD or DVD, but it is sure that magnetic tapes from the 1960s are already today unreadable because of decay. Furthermore, a few bit errors can render a digital information product completely unusable, while a book with a few missing pages is still readable.

Digital information products can be transmutable. They can be modified instantly. A book is also transmutable. One takes a pen, and adds information to the book. One xeroxes the book and hides a few lines with a piece of paper, and we have a transmuted copy. A better term instead of transmutability would be fragility for accidental or fraudulent changes on data files, or volatility for intended and useful changes. However, digital information does not need to be modifiable in any case. Digital information stored on read-only media like CD, DVD or read-only memory (ROM) must be copied first before it can be modified.

[11] Though information does not underlie physical wear and tear, it still underlies obsolescence of many kinds and often looses value over time. For someone who has listened to a song 40 times in a row, the music piece has lost significant parts of its entertainment value and originality.

Digital information products are reproducible. Books are reproducible, too. Monks copied books for centuries by hand, but it was hard work. Everyone can copy digital information within seconds using modern ICT today, with no loss of quality. That's the important difference. The difference between being digital or not is efficiency and effectiveness. Digital technology can enable customers and companies to do tasks more efficiently, and more effectively. However, without the existence of digital media like the Internet and the vast diffusion of ICT, being digital would be rather senseless. Therefore, digital information is not only media-dependent, but also highly ICT-dependent, and ICT still changes at unabated speed.

Digital Products and Processes

Products can be digital, and processes can be digital, and usually there are uncountable interdependencies between both views. A digital product is fairly useless without corresponding soft- and hardware to play or edit it. For example, a MP3 file depends on hard- and software that is capable of transforming the compressed data back into sound waves. Furthermore, hard- or software must be compatible to a given MP3 standard in order to play a certain MP3 file.

In the case of software – executable digital information that provides certain functionality and can be used to implement digital processes – compatibility issues are even more complex. Software needs to be compatible to various underlying hard- and software layers in order to perform accurate. Single layers may change over time, either in an evolutionary or revolutionary way [Shapiro and Varian, 1999, p. 295]. Therefore, the lower the layer in the hierarchy is, the more important standards are, as the upper layers rely on the fixed functionality of lower soft- and hardware layers.

Digital Distribution

Digital information can be distributed and acquired instantly over digital networks like the Internet. Traditionally, information has been distributed on data media. Data media are physical media like paper, celluloid, CDs, DVDs, audiotapes or videotapes that form a more or less durable unity with the contained digital or analog information, but first of all, data media need to be reproduced and shipped as physical entities during distribution. Therefore, the variable costs of physical distribution are an absolutely significant part of the total costs while the speed of physical distribution is lower than the speed of digital distribution at the same time [Hass, 2002, pp. 77-78].

Digital distribution (digital delivery) can be defined as the principle of providing digital information or content over digital networks, either in the form of products or services[12]. Using existing infrastructures like the Internet as a transmission medium, digital information can travel at a speed up to light speed [Picot and Franck, 1988, p. 545], while the variable costs of distribution can be low because immaterial information can be reproduced and transferred at low cost. This leads to possible marginal total costs near zero. Provided that an adequate high output quantity is sold, the average total costs of information production will converge to the marginal costs, hence fall close to zero [Hass, 2002, p. 46 and pp. 78-80; Koiso-Kanttila, 2004, p. 54]. Digital distribution over digital networks therefore is the most cost-efficient way of distribution for digital information products at the "core of electronic commerce" [Choi, Stahl and Whinston, 1997, pp. 16-20].

4.4 Modularity

Products can be modular, and processes can be modular. Modularity is good because it raises flexibility and reusability; modularity is bad because it raises complexity of a system [e.g. Blecker et al., 2005, pp. 45-61; Köhler, 2005, p. 25; Hui and Chau, 2002, pp. 75-76]. There is a basic trade-off between flexibility and complexity, and determining a system architecture with a medium, goal-orientated granularity is no trivial task in general.

What is Modularity?

Ten years ago, Baldwin and Clark asserted that "strategies based on modularity are the best way to deal with […] change" [1997, p. 84]. In their article *Managing in an age of modularity*, they gave a comprehensive definition of modularity:

> "Modularity is a strategy for organizing complex products and processes efficiently. A *modular* system is composed of units (or modules) that are designed independently but still function as an integrated whole. Designers achieve modularity by partitioning information into *visible design rules* and *hidden design parameters*. Modularity is beneficial only if the partition is precise, unambiguous, and complete.
> The visible design rules (also called *visible information*) are decisions that affect subsequent design decisions. Ideally, the visible design rules are established early in

[12] Based on a Wikipedia definition [Wikipedia, 2006] that has been slightly improved by the author.

> a design process and communicated broadly to those involved. Visible design rules fall into three categories:
>
> - An *architecture*, which specifies what modules will be part of the system and what their functions will be.
> - *Interfaces* that describe in detail how the modules will interact, including how they will fit together, connect, and communicate.
> - *Standards* for testing a module's conformity to the design rules (can module X function in the system?) and for measuring one module's performance relative to others (how good is module X versus module Y?).
>
> […] The hidden design parameters (also called *hidden information*) are decisions that do not affect the design beyond the local module. Hidden elements can be chosen late and changed often and do not have to be communicated to anyone beyond the module design team."[13]

The IBM personal computer (PC) platform is maybe the most prominent example for a flexible, modular and open system. Components or independent subsystems (modules) that conform to the visible design rules can be exchanged, added to or removed from the system that consists of a single main board at its core. Components like sound cards, printers and network cards can be attached or detached with minimal effort, defect components can be replaced, and new components can be developed independently as long as they conform to the accepted visible design rules.

Modular Product and Process Platforms

Many information products are inherent modular or can easily be modularized, especially when they are digitalized at the same time. Books consist of chapters and paragraphs, music CDs have single tracks, covers and inlays, and newspapers mainly consist of headlines, articles and pictures. The according supply chains and processes are also modular. Various journalists contribute to a newspaper, and all they need to know is how long an article should be and what is the topic. It is similar when different artists contribute single tracks to a CD, or when different authors write for a compilation. Modularity hence allows for a high parallelism and independence in the process of information production.

When speed and costs matter, companies can benefit from building product platforms to store and retrieve modules, and process platforms to automate the value-added process. Modules can be reintegrated and composed to various different

[13] [Baldwin and Clark, 1997, p. 86]

products or processes. They can be reused several times in different products or processes. Modularity is especially useful to the production process when employed early in the value-added process, starting right from the acquisition of resources. Inter-firm acquisition of information can be automated. For exchanging structured media-independent information, the eXtended Markup Language (XML) standard has proved to be a useful tool, while Web services seem to prevail for the implementation of modular processes.

On the market side, due to the increasing digitalization and modularization of the information production process, a trend towards postponed reintegration of information and media can be observed. Customers increasingly have the choice which medium they want to use to access information, and if they want a digital or physical copy [Hass, 2002, pp. 83-86]. When the customer becomes an active agent in the supply chain process, these developments can be subsumed under the keyword 'customer integration'.

In consequence of digitalization and modularization of products, traditional integrated products can increasingly be offered to the customer in desintegrated form. How much modularity will be featured within information products and processes that reach beyond the boundaries of a company is a highly strategic decision for a company. In the case of digital distribution, empirical evidences exist that it is reasonable to not only sell or rent products in their integrated form over physical distribution channels, but also single and rebundled marketable modules (or even customer-specific offers) online, to economically exploit the additional possibilities of digital and interactive media like the Internet, while care has to be taken that different channels don't cannibalize each other[14] [Stahl, Schäfer and Maass, 2004, p. 65].

Further customer integration in the supply chain and strategies like mass customization are likely to enjoy increasing importance in the near future of the information industry. Besides digitalization, modularization is a common prerequisite of all these new methods and strategies that are based on information filtering and enrichment [Pine, 1993, p. 196; Choi, Stahl and Whinston, 1997, pp. 325-326; Piller, 2003, p. 226; Blecker et al., 2005, p. 163].

[14] In general, different product bundles should be sold on- and offline, because the same products distributed over different channels tend to compete with each other and therefore don't create too many additional revenues. Digital distribution should take advantage of the interactivity of the medium.

Part II

CUSTOMER ORIENTATION AND THE SUPPLY CHAIN

5 Towards a Customer-Oriented Strategy

In this thesis, a customer-oriented strategy will be elaborated to address societal developments like the individualization of demand in former mass markets, technological developments like the possibility for cost-efficient digital distribution and a general increase of competing information and information products that goes hand in hand with an increasing information overload on the demand side.

The idea behind a customer-oriented strategy is that companies must shape information products so much that they match the preferences of each individual or corporate customer. Mainstream marketing is a holdover of the mass production era. Mainstream information products are often easy to pirate. Products need to become personal instead. Products can for example be offered in the form of personalized subscription services, or they can be mass-customized. True value has to be delivered, different value has to be delivered to each customer, and interaction with customers has to take place. Brand loyalty has to be created. Variety, samples and test-drives have to be offered and most of all need to be easy searchable and accessible over the Internet in order to attract new customers.

Copying, sharing and reselling of information products has to be accepted to a certain degree, mainly because these activities are an important part of the value perceived by the customer. The customer may however resign any of these activities on their own free will in exchange for a lower price.

In the following, a generic framework for business strategy will be developed that can serve as a guideline for information companies in search for extraordinary performance.

5.1 Innovate or Adapt?

In their article *To Serve or Create?,* Berthon, Hulbert and Pitt [1999] discussed the two guiding templates for business strategies: Innovation orientation and Customer orientation, or Innovation and Adaption respectively (see figure 6). By differing 'low' and 'high' customer orientation and 'low' and 'high' innovation orientation (see figure 10), they basically recreated Ansoff's product-market matrix as depicted in figure 5 – at least they should, as the model of business strategy with an orientation towards either innovation or adaption is the result of a simplification of Ansoff's 2x2 matrix, as described in chapter 2.2.

Innovate or Adapt, Shape or Follow, Innovation Orientation or Customer Orientation

However, as times have changed, something different has been created, and yet the same. While describing the four strategic modes they name Follow/Shape/Interact and Isolate, Berthon, Hulbert and Pitt well discussed the basic trade-off relationship between Innovation orientation and Customer orientation. So they stated for the 'high-high' combination, the Interact mode, in fact a hybrid business strategy:

> "After careful thought, however, interaction would probably get the popular vote. Unfortunately, reality is seldom that simple. Dialogue and interaction may be expensive at best, and irrelevant at worst. Further, though dialogue and interaction may reduce risk, they may be less likely to consistently produce either the breakthrough product or service that characterizes the successful shaper or the devotion to true customer satisfaction that good followers are able to deliver."[15]

Hypothetically removing this hybrid strategy from the matrix, together with the 'low-low' value or Isolate strategy – a strategic option that is likely to be as attractive as it sounds – two strategic modes remain, named Innovation and Adaption, or Shape and Follow, or Innovation orientation and Customer orientation.

An important result of Berthon, Hulbert and Pitt's approach is that high customer orientation works together with low innovation orientation, while high innovation orientation comes together with low customer orientation. This is a result of the trade-off relationship between innovation orientation and customer orientation,

[15] [Berthon, Hulbert and Pitt, 1999, p. 49]

and Porter asserts that "A Sustainable Strategic Position Requires Trade-offs" [Porter, 1996]. Believing Porter or not, the interact mode ignores the trade-offs between customer orientation and innovation orientation[16].

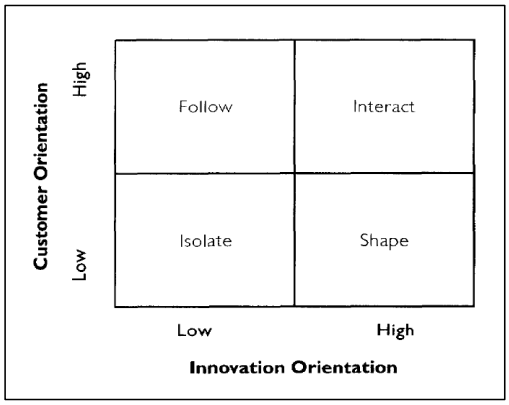

Figure 10. Strategic Orientation Modes of the Business Unit
[Berthon, Hulbert and Pitt, 1999, p. 44]

Interestingly, Berthon, Hulbert and Pitt name some 'mass customizing companies' as examples for the interact mode. Here are some anticipated facts about mass customization: mass customization is a technology-driven product or production strategy (compare to figure 2), as for example indicated by Utterback [1994, p. 98-99]. Therefore, its location in organizational hierarchy is the operational or functional level. There, mass customization can potentially save (some) costs while fostering product differentiation. But this is on the operational level. An operational strategy should neither influence a corporate strategy, nor a business strategy. This would turn the whole strategic hierarchy upside down, as business strategies encompass operational strategies, but not vice versa. Technology should not drive business strategy, but vice versa. Shapiro and Varian already in 1999 wrote in their book *Information Rules*: "Technology changes. Economic laws do not" [p. 2]. Technology becomes obsolete. Business rules do not. Therefore, hybrid strategies, more exact simultaneous hybrid strategies – if they are feasible at all – should be implemented where they belong: not on the corporate strategy level, not on the business strategy level, but on the operational level. Different operational plans may have to be carried out to achieve an outcome that at a high level of abstraction is called a hybrid strategy.

[16] Likewise, a popular engineering saying is that you can have a project with high quality, low cost and in the desired time – if you select two attributes. This is sometimes also called the 'project triangle'.

Simultaneous and Sequential Hybrid Strategies

Literature names simultaneous and sequential hybrid strategies [e.g. Piller, 2003, pp. 219-221]. The usefulness of simultaneous (ambiguous) hybrid strategies executed on the higher organizational levels of a company is questioned here. Simultaneous hybrid strategies are often said to be based on product or process innovation, i.e. raised product effectiveness and process efficiency based on current technology in vogue. Product and process innovation however are not the subject of the organizational level of corporate strategy. Rather, they belong to the operational or functional level of an organization and should therefore be handled there. High-level execution of simultaneous hybrid strategies can lead to severe conflicts on lower organizational levels, as already stated by Porter in his original work [Porter, 1980; Brack, 2003, p. 63]. To give a behavioral argument against high-level simultaneous hybrid strategies, communication of the strategy to lower levels of the hierarchy may be difficult as well, as simultaneous hybrid strategies are often complex. Corporate and business strategies however have to be clear, as they are to be understood by human beings. Furthermore, the single objectives of a hybrid strategy are highly contradictory, which may not attract attention on corporate or business unit level, but on the operational level, these contradictory objectives are likely to be detected with pain.

Sequential (hybrid) strategies however can be useful on corporate or business strategy level. For example, a sequential (hybrid) strategy can be pursued in separated regional areas, i.e. the definition of a ‘corporate strategy’ is moved downwards to the business unit level as part of a business strategy, as already depicted in figure 6. With this, different business units can have a different focus and location of competition, resulting in a ‘virtual hybrid corporate strategy’. Another option for a sequential hybrid strategy is the successive shift of corporate strategy, e.g. a shift from cost orientation to differentiation in successive planning cycles, or a successive shift from an innovation-oriented business strategy to a customer-oriented one.

5.2 Corporate Strategy Revisited

In a 1993 study of 715 business units, Miller and Dess analyzed Porter’s theory of the exclusiveness of cost leadership and differentiation [Miller and Dess, 1993; Piller, 2003, pp. 216-217]. They developed an extended version of Porter’s model that also contains simultaneous hybrid strategies. Without going into depth, the main finding of

their study was that "the results […] strongly suggest the need to rethink Porter's guidelines suggesting that firms generally not attempt to combine forms of competitive advantage in an effort to create 'hybrid' strategies. This research indicates that not only are hybrids feasible, but also that they are extremely profitable" [p. 579].

Even though their research was extensive and created valuable insights that for example a strategy should not only deal with differentiation or cost exclusively, an assumption has been made by Miller and Dess that needs to be criticized here. They assumed that each dimension of cost, differentiation and focus in Porter's model is a continuum and in the following introduced discrete values of 'low cost', 'medium cost' and 'high cost' for the 'relative cost' dimension, and 'low', 'medium' and 'high' differentiation for the 'relative differentiation' dimension [p. 564-565]. On the example of differentiation, it is questioned here that this can be done. Differentiation simply is not relative. A company actually differentiates in order to not be comparable to other companies. Differentiation means different. If two companies A and B can be ordered in such a way that it can be objectively said that company A provides more value to all customers than company B, then at least one of both is no differentiator, but an imitator. A differentiator would provide a different value in order not to allow an objective comparison. Differentiators hence cannot be ordered along a single differentiation scale, because they are all different. They are not better. They are not worse. They are just different. Every single differentiator is different, unique, and incomparable. This is the normative vision of differentiation.

SAP and Oracle, two oft the world's largest standard business software vendors, are an example for two differentiators. Both companies offer software products with millions of lines of code. No human being can ever analyze the core products of both companies completely and finally come to a conclusion that Oracle is better than SAP, or vice versa. Some business analysts may give recommendations (certification signals), but these recommendations are surely highly subjective.

In addition to the previous exposition about the vision of differentiation, there also exists a vision of cost leadership. An important point often overseen in the discussion about hybrid strategies is that the vision of cost leadership does not only aim at low costs, it aims at the lowest cost structure in the industry, which is well a difference. So what is called a hybrid strategy at some other places often is just a differentiation strategy with an additional objective of low cost. Low costs and differentiation are no contradiction, only a simultaneously pursued cost-oriented

corporate strategy and differentiation strategy are conflicting and highly ambiguous, whereas a differentiation strategy surely can be pursued on different cost-levels, as well as a cost-oriented strategy can be pursued on different 'value-levels'. Especially in the information industry and on the operational level, ICT can be used to differentiate and save costs at the same time, but this is really not the same as simultaneous cost leadership and differentiation.

Miller and Dess concluded that Porter's model needs some rethinking. It is argued here that what Porter's model needs first of all is clarification. On the basis of Berthon, Hulbert and Pitt's approach, let cost leadership and differentiation be two visions of a company's future state. Furthermore, the main objectives to reach one of these states may be cost measures (high, medium, low or lowest costs in the industry) and value measures (low, medium, high or different value). Finally, the two strategic options to achieve these visions on corporate level should be cost orientation and differentiation. The result is depicted in figure 11:

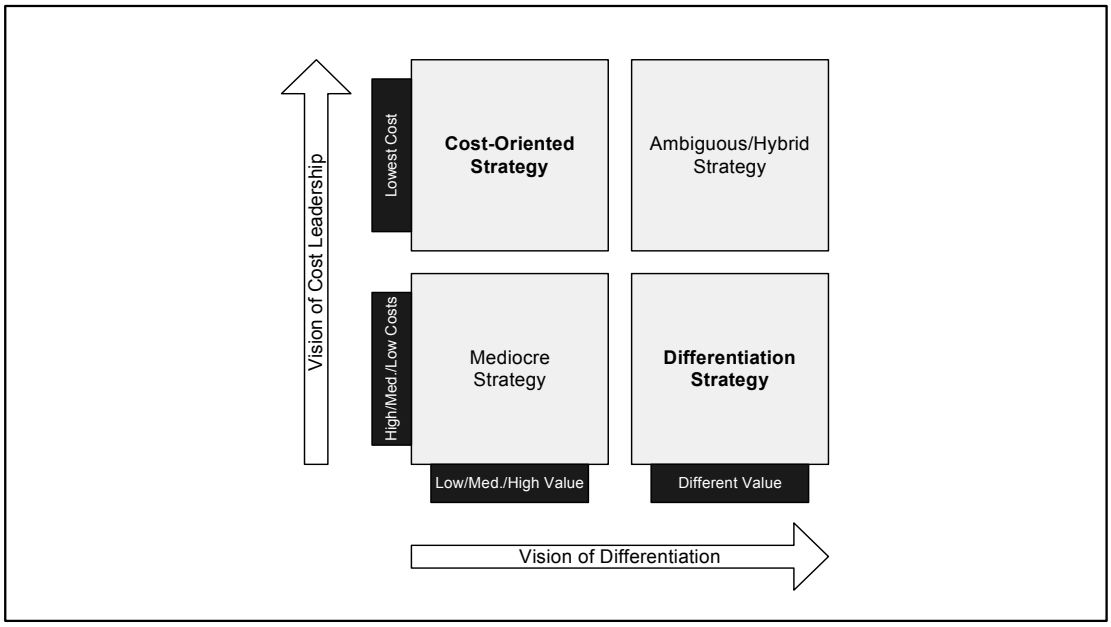

Figure 11. The Vision of Cost Leadership and the Vision of Differentiation

To recapitulate, the objective of a cost-oriented strategy is neither low cost, nor medium cost, nor high cost, but the single, lowest cost structure in an industry. Likewise, a different product value is neither low, nor medium, nor high. It just differs from all competitive product values. The only instance being able to measure different products' value is each single customer, and chances are he/she cannot even tell 'how

much' different a product is. Exactly that is the objective of a differentiation strategy, to outmaneuver competition with a customer not even being able to compare different products or companies. Corporate strategies that don't strive for either differentiation or cost leadership are mediocre strategies. Corporate strategies that strive for both differentiation and cost leadership are ambiguous strategies, what Porter calls 'stuck in the middle'. Though companies with a mediocre or ambiguous strategy not automatically need to be unsuccessful, success is more likely to be the result of accidental hits rather than the result of strategic management aiming at one vision.

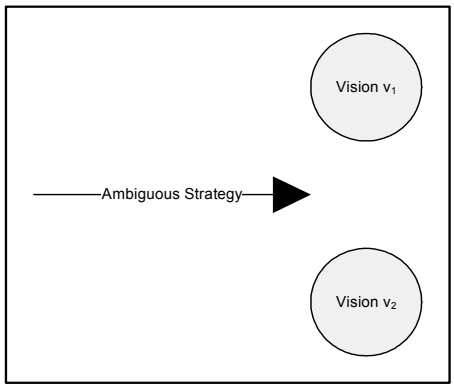

Figure 12. One Strategy, Two Visions

A sustainable strategy needs to point towards one vision. A strategy that points at two visions at the same time, Porter would say points in the middle of both – and there is nothing in between two visions– so in reality it points at nothing. Hence, hybrid or mediocre strategies in reality often points at nothing (see figures 12 and 13). In the context of corporate strategy, there is no need for hybrid strategies, rather exists a need for a clear vision.

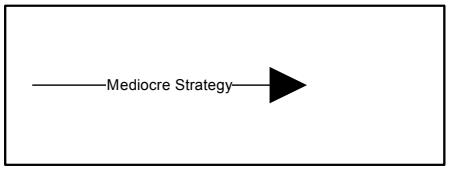

Figure 13. One Strategy, No Vision

Finally, Porter's strategies already are kind of hybrid strategies, carried out with multiple plans in order to achieve the objectives, but there is only one single primary objective for each strategy. Secondary objectives may be cost saving for a

differentiation strategy, and high customer value for a cost-oriented strategy. Because every company's resources are limited, it simply makes more sense to focus on one vision that can be achieved while probably but not necessarily achieving some lower-priority secondary objectives regarding costs or value at the same time, than to aim simultaneously at two contradicting visions and likely not reaching more than mediocrity in the end.

5.3 Business Strategies

When pursuing a 'virtual corporate strategy', every business unit can have its 'own' corporate strategy. In the next place, the two core options for a competition-oriented business strategy are Shape (Innovation orientation) or Follow (Customer orientation) like depicted in figure 10 (and figure 6), with the Isolate and Interact strategy as mediocre and hybrid business strategy respectively to be avoided for already discussed reasons. The approach of Berthon, Hulbert and Pitt can still be improved. First of all, the two dimensions in the matrix represent two visions, the vision of 'high' innovation and the vision of 'high' customer orientation, whereas an implicit (but not obvious) trade-off relationship exists between both dimensions.

Incremental or Breakthrough Innovation

Instead of 'high' and 'low' innovation, the common distinction between incremental and breakthrough will be used as measures for an innovation vision. In the case of new products, newness can be either 'new to the company' or 'new to the market' [Cooper, 2001, p. 13-14]. In this thesis, innovation will be understood as any innovation that is new to a company. In the case of innovation introduced by a company, it may or may not be new to the market, too.

Innovation often occurs in evolutionary cycles [Baker and Hart, 1999, p. 19]. According to Nikolai Kondratieff's macroeconomic theory that has been updated by Nefiodow, western capitalist economics have long-term cycles of boom followed by depression. Following Nefiodow, we are currently in the fifth wave with ICT being the base innovation, whereas the fourth wave from approximately 1940-1989 was based on mass production, mineral oil and the automobile [Piller, 2005, pp. 60-61].

VanHoose distinguishes invention and innovation. An invention is "Creating of a new process for producing a good or service, a novel business organization

method, or a unique product" [2003, p. 205]. An invention is a prerequisite for innovation; it is a technical process. However, many inventions never reach the market. Therefore, an innovation is the economic adoption or transformation of an invention "into something that lowers costs of production, reduces the costs of operating a business, or provides concrete benefits inducing consumers to buy a product" [VanHoose, 2003, p. 206].

Innovation can be categorized in many different ways, because innovation – like differentiation – is a highly abstract and multidimensional term. In general, economists distinguish major (breakthrough) and minor (incremental) innovation, and product and process innovation, leading to four possible combinations: breakthrough product or process innovation and incremental product or process innovation. Breakthrough innovation can be defined as "A process or product innovation that brings about a significant change in an existing market or the creation of a new market" [VanHoose, 2003, p. 206]. Breakthrough innovation creates turbulences in an existing market or creates a totally new market. Incremental innovations are product or process innovations that "result in relatively small cost reductions or revenue enhancements or that primarily allow firms to differentiate their products" [VanHoose, 2003, p. 206]. As already mentioned, breakthrough and incremental innovation will be considered from a single company perspective in this thesis. "By definition innovation consists of *doing something new* and so must overcome the inertia of the old, established and hitherto successful way of doing things" [Baker and Hart, 1999, p. 13]. Breakthrough innovation is doing something that is radically new to a company, radically restructuring existing products, product lines or processes or creating completely new ones, while incremental innovation is doing slight improvements or functional additions to existing products, product lines or processes.

Two competing hypotheses about the sources of innovation have emerged. One is an inside-out or technology-push view, the other is the market-pull or outside-in hypothesis [e.g. Schary and Skjøtt-Larsen, 2001, p. 26; VanHoose, 2003, pp. 207-209]. Often technology-push is the driving force of bringing breakthrough innovations to the market, while market-pull may be the reason for incremental innovation regarding existing products and processes. It is clear that technology driven innovation must meet a sufficient demand for successful commercialization, while market driven demand can only be satisfied if technological possibilities exist to create according solutions. Therefore, interdependencies exist between both views.

Another hypothesis that has been empirically validated by Utterback [1994] for various industries is that process innovation follows breakthrough product innovation in reoccurring cycles (see figure 14):

> "Once the dust has settled on the contest for *product* innovation, then competitive engagement shifts to a new battleground: *process* innovation. When the marketplace decides that the QWERTY keyboard, or some other design standard, is what it wants, then innovators start figuring out how to make that peculiar keyboard as efficiently as possible; and some firms will be better able to do that than will others."[17]

Two generalized conclusions can be drawn from Utterback's work. First, incremental innovation follows breakthrough innovation [e.g. Utterback, 1994, p. 91; Tushman and Anderson, 1986, p. 441]. And second, large companies that better can exploit economies of scale through process innovation follow small innovative companies that then are often forced to exit an industry after the peak of product innovation has been reached and a so called dominant design or standard has been established [e.g. Utterback, 1994, pp. 30-31]. A new breakthrough product for example creates its own supply chain or network that evolves over time, while the product itself continues to evolve incrementally, too.

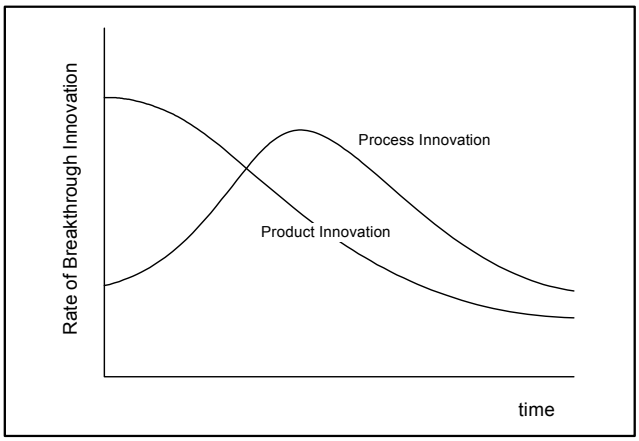

Figure 14. The Dynamics of Innovation in Industry [simplified from Utterback, 1994, p. 91]

Market Orientation or Customer Orientation

Instead of 'high' and 'low' customer orientation, the use of market orientation and customer orientation is proposed here. Most information companies are traditionally

[17] [Utterback, 1994, p. 30]

market-oriented, and the market in this scheme of things is a mass market. This means that an information product is usually targeted at a specific, predefined part or segment[18] of a mass market. The segment is a set of individuals. Each individual has expectations towards the product, but the product may not meet all of her/his expectations, as mass products are most often standardized to serve an average customer in a segment. In figure 15, the possible continuum between the two extremes of a homogenous mass market and a 'segment of one' is depicted:

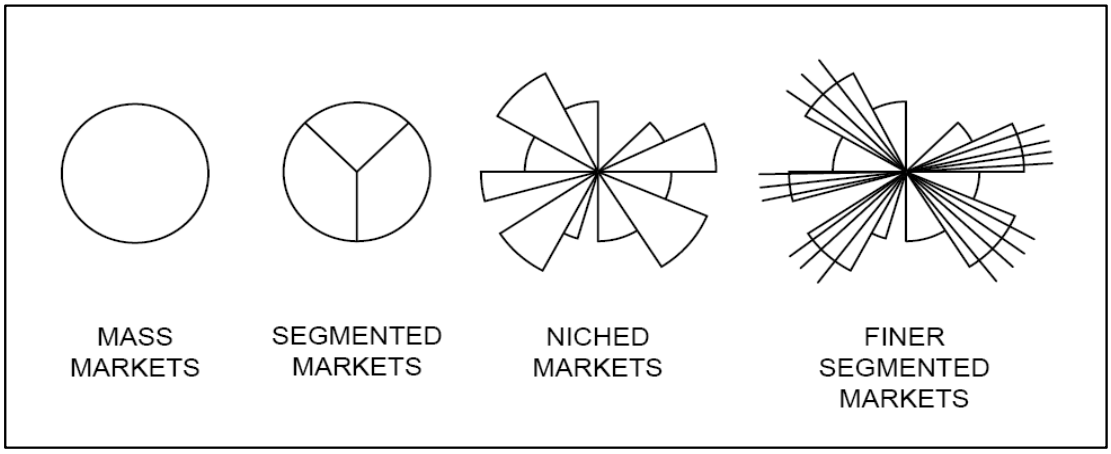

Figure 15. The Evolution of Market Segmentation [adapted from Davis, 1987][19]

In this thesis, homogenous mass markets and large market segments as targets will be subsumed under the term 'market orientation', and targeting small niches or fine segments up to the smallest unit of one individual customer will be referred to as 'customer orientation'. Nowadays, technological advances provide possibilities that enable companies to rediscover the single customer and his/her preferences, so a distinction is necessary. Basically, market orientation and customer orientation share the same goals – serving each individual customer – only with different effort and performances. It has to be stressed that the vision of customer orientation is about a clear segment size of exactly one, so in fact, this strategy is not at all about segmentation, but a feasible strategy may also aim at slightly bigger segment sizes [e.g. Pitta, 1998, pp. 479-480; Jiang, 2000].

[18] An introduction to the methods of market segmentation can be found at [Cooper, 2001, pp. 287-291], [Kara and Kaynak, 1997] or [Balderjahn and Scholderer, 2002].

[19] Taken from [Kara and Kaynak, 1997, p. 884].

The Four Basic Options for a Competition-Oriented Business Strategy

To finish this framework for a generic business strategy, Berthon, Hulbert and Pitt's approach will be refined and combined with the well-accepted theory from the previous paragraphs. But first, a few words need to be said about Porter's third (and fourth) strategic option, the niche strategy. Customer orientation as used in this thesis is just another name for a niche strategy. Market orientation is another name for core market focus. When discussing the strategic orientation modes of a business unit, one has to consider the location of competition (core market or niche) and the rules of competition (innovation or adaption) simultaneously. The decision about innovation or adaption can be regarded as another view on the location of competition. Berthon, Hulbert and Pitt in fact managed to unite the two competing guidelines for a business strategy in one single model. This is useful because location and rules of competition are no independent variables. In Steinmann and Schreyögg's model (see figure 6), the decision about the location of competition is redundant, as it is the same as the decision about the degree of customer orientation (or adaption). Therefore, the eight strategic options for a competition-oriented business strategy can be reduced to four basic strategic options without any loss of information.

Let breakthrough innovation be a business units' innovation vision. Customer orientation is a market vision with a long history[20], a vision about a business unit's distant state that nevertheless is reachable. Furthermore, the main objectives to reach one of these two states may be innovation measures (incremental or breakthrough) and market measures (segments or customers). Finally, the two strategic options to achieve these visions should be innovation orientation and customer orientation. The resulting decision matrix is depicted in figure 16.

The vision of breakthrough innovation is not only about innovation. It is about attacking the Microsofts, the SAPs, the Disneys, the Amazons of the world and bring them to a sudden fall. It is about inventing the base technology for the sixth Kondratieff cycle, it is about the paperless office, it is about flawless technology to

[20] "Proponents of the marketing concept have long argued that creating a satisfied customer should be the primary objective of business (Drucker 1954, Keith 1960, Levitt 1960). Throughout the past four decades, however, the marketing concept has been more an article of faith than a practical basis for managing a business (Day 1994)" wrote Heiens [2000, p. 1] in his article *Market Orientation: Towards an Integrated Framework*, based on [Day, 1994].

disseminate the right information in every place of Earth, at the right time and in the right quality, affordable for everyone and without the need of carrying multiple heavy gadgets, and so on. It has to be a vision. Likewise, the vision of customer orientation is not about having a product with 500 customizable features. It's about serving every potential customer out of the approximately six billion human beings in the world with an individual offer, delivering a value experience, no matter what the specific and individual needs are.

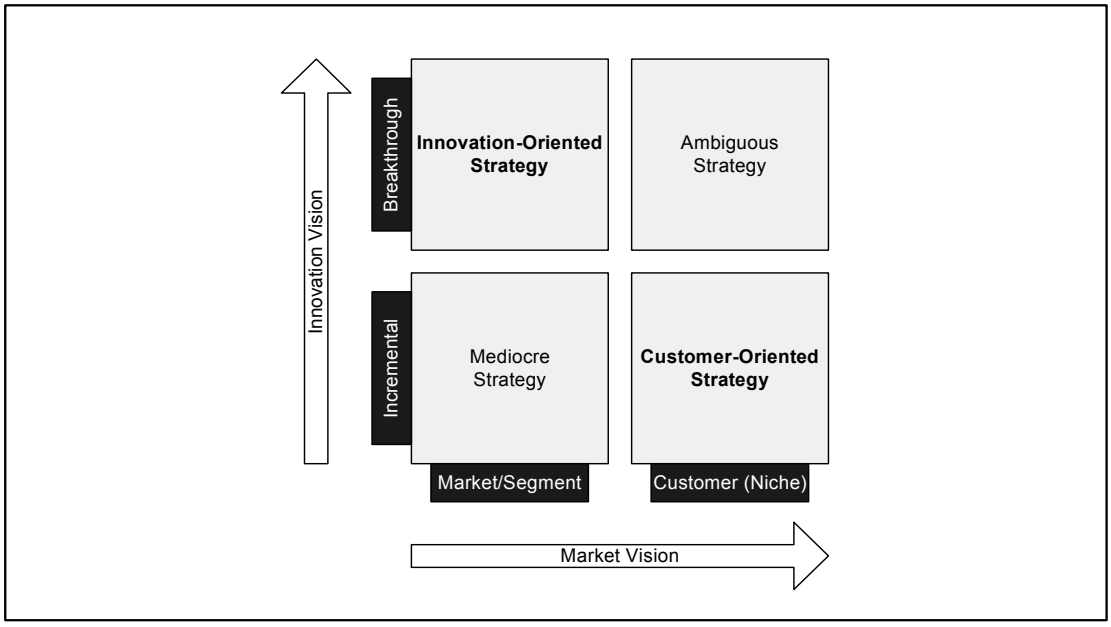

Figure 16. The Vision of Breakthrough Innovation and the Vision of Customer Orientation

Like on the corporate strategy level, a trade-off relationship exists between innovation orientation and customer orientation. Trade-offs between innovation and customers might not as clear as on the corporate strategy level, but hopefully this will become clearer in later chapters of this thesis. Basically, customers are often not very receptive for breakthrough innovation. They pursue their very own goals, while breakthrough innovation is targeted at large market segments. Bringing breakthrough innovation to the market is expensive and needs to be adopted by innovative customers first, and by society as a whole later. The larger a market segment is, the likelier it is that enough innovative customers can be found that induce a possible positive feedback.

Inversely, breakthrough innovation can destroy the internal order and stability of complex systems and networks that are undoubtedly needed to serve each single

customer in an individual way. Companies for example experience the effects of breakthrough innovation in large and radical business reengineering projects. Outdated processes disappear and are changed; the organization is turned upside down; legacy systems that worked for decades often have become so complex that the only feasible way is to switch them off and replace them completely. Breakthrough innovation has the potential to render existing customer-oriented systems obsolete, and a new cycle of incremental product and process innovation will start.

Figure 11 and 16 together cover the four basic options for a competition-oriented business strategy. They are a unification of Porter's and Ansoff's groundbreaking works about corporate and business strategy, a normative model to guide the definition of a business strategy. However, defining a vision and a strategy is only the beginning. Strategy is activity. In the following chapters, it will be discussed how a customer-oriented strategy can be implemented in the information industry. A customer-oriented strategy is built on incremental innovation, which is much easier to achieve than breakthrough innovation, as customers themselves can give input and ideas for incremental innovation. Customer-oriented business units even more than market-oriented units need to develop certain capabilities that enable them to achieve a fit with their external environment. An optimal fit between internal capabilities and external environment is the goal of every successful strategy, as already stated in chapter 2. With regard to this topic, Day writes:

> "Two capabilities are especially important in bringing these external realities to the attention of the organization. One is the market sensing capability, which determines how well the organization is equipped to continuously sense changes in its market and to anticipate the responses to marketing actions. The second is a customer-linking capability, which comprises the skills, abilities, and processes needed to achieve collaborative customer relationships so individual customer needs are quickly apparent to all functions and well-defines procedures are in place for responding to them."[21]

Market sensing, among others, can be achieved by involving customers in new product development (NPD) and product management (PM) activities, or by applying the method of open innovation in general, whereas customer linking can be achieved by integrating customers in supply chain processes.

[21] [Day, 1994, p. 49]

6 Customer Integration

On the operational level, strategies are developed and implemented through tactical and operational plans. In the lifecycle of every information product, there comes a time when breakthrough innovation is not as easy to achieve as it was at the early stages. The products have matured, their complexity has significantly increased and customers' expectations have increased likewise over time. In the information industry, this usually happens faster as in other industries, as it is a "fast-clockspeed industry" [Fine, 2000].

Customer orientation can become a substitute for innovation when innovation rates slow down. Customer integration is a possible implementation method of customer orientation. Evolved technology is the base for customer integration, and with this, it becomes affordable to focus on single customers on a large scale. Both companies and customers can profit from well-implemented customer integration.

In the supply chain, customer orientation is implemented by integrating the customer in production processes, i.e. dividing a market into 'segments of one' and providing processes where each customer is the potential starting point. Customer integration is the contribution of external factors (digital agents, real or nominal goods, rights, preferences, customer information etc.) by current or potential customers to the production of goods and services of a company[22]. The goal of customer integration first of all is the provision of customer-specific solutions.

In order to integrate the right customers, a clarification is needed of what is a customer. Customers can play different roles, and they can be integrated at different stages of the supply chain in order to enable them to interact or literally inter-act with the company over different channels at will.

[22] Definition based on [CeDiS, 2003] and translated from German.

6.1 Customer Integration and End Users

Customer integration makes the boundaries of a company more permeable for its customers. The applicability of customer orientation in general and customer integration in particular depends more on inner stability of companies and readiness of customers than on innovative, new and untested technology. Mature products, broadly accepted standards and users that are experienced with a given product class for years are some preconditions for the implementation of customer orientation. With customer integration, experienced users can for example gain more control of features they are already familiar with. Inexperienced users on the other hand may prefer simple standard products. Therefore brand-new technologies or product classes do not work well together with customer integration in general, because the critical mass and installed base of experienced users has to be developed first, and customer integration cannot be implemented out-of-the-box, it has to grow through collaboration.

Customer integration can be subdivided into two broad areas: B2B (business-to-business) integration and B2C (business-to-consumers) integration. B2B integration is a symmetric relationship. What is called customer integration for the seller party is supplier integration for the other party at the same time. The integration of interorganizational processes has been in the center of interest for many companies since the early time of electronic data interchange (EDI), and in complex supply chains or networks, customer integration plays an important role in making the chain as a whole more efficient, not only because B2B transaction volumes usually are significantly higher than B2C sales. Examples for B2B integration are electronic purchase, product configurators, order tracking or Internet support portals [Haertsch, 2000, pp. 25-27].

When a supply chain consists of subsequent links, it is often valuable to not only focus on direct customers, but also consider the needs of downstream users and customer's customers respectively [Pine, 1993, p. 224; Fischer et al., 1997]. Helping customers to serve their customers better gives suppliers a chance of differentiation, while downstream intermediaries then can satisfy the needs of end users better because they are closer to the market. Producers selling modular content to downstream intermediaries may be an example for the information industry, enabling these intermediaries to offer modular and customizable solutions to end users.

Consumers or end users are the end points of supply chain processes. Traditionally, consumers received mostly immutable and static information products provided by a one-way supply chain or network. With B2C integration, these end points can actually be turned into entry points. Customer loyalty can for example be raised by enabling consumers or end users to filter or enrich content at the core of information products, or even by providing intelligent information products that dynamically adapt to customers' individual needs in the course of interaction. Consumers can also be integrated in the distribution process to acquire new customers. Independent consumers are often better and trustworthier advertisers in the eyes of other consumers than a company's professional representatives.

Finally, customers sometimes are not easy to recognize. In the media industry, many offers on the Internet or other media are free for end users only because advertisers sponsor a particular place or event in order to buy and catch attention. Therefore, primary customers in the media industry often are advertising companies, whereas consumers only come second [e.g. Sjurts, 2002, p. 13; Hass, 2002, pp. 123-125]. B2B integration with advertising companies may then be more important in the media industry than B2C integration. However, even though this situation basically encourages media company to produce rather low-quality products (lemons), end users are not to be neglected because without a sufficient quantity and first of all quality of end users, the value of advertising space decreases, too.

6.2 Integrate the Customer in the Supply Chain

Customer integration is a generic term that subsumes various possibilities for implementing strategic customer orientation. Creating an active customer that acts, or inter-acts with the company or the products he/she uses is a possible way to go. One of the most important benefits of customer integration is the ability to increase customer loyalty by directly interacting with each customer [Piller, Moeslein and Stotko, 2004, p. 436] while providing durable, stable, reliable, renewable and constant value over time. Suitable interactive channels are currently Internet/email, telephone/fax, mobile networks and direct face-to-face contact with customers. Basically, customers can be integrated into various supply chain processes from production to consumption. Production, refinement, distribution and consumption in particular are suitable stages for customer integration (compare to figure 8).

Production and Refinement

At the production stage, original content or information is created. Sometimes customers can contribute own information to the production process. Surely there are products that suit better for customer integration than others. In the context of mass customization, customers can for example add personal content like digital photos, own videos or similar content to a final product. Many Internet communities in general are based on customer activities. Support forums for example provide a platform where customers can ask questions about complex products or give answers to other users' questions, producing content. Fan communities in the media industry are a way to gather customers that share the same interests. Wikis like wikipedia.org are completely built of content contributed by community members. Certification signals are another field for customer-contributed content. Opinions, user reports or reviews about products like for example used by amazon.com or user ratings at ebay.com can be used in social filtering systems. Some software products like office or image processing software have the main purpose of enabling customers to produce their own content. This, in combination with the trend to provide increasing functionality online in the form of services, up to completely Web-based software, opens further possibilities to make customers come back often, like it is already done with Web-interfaces for free email-accounts where customers can manage not only their emails but also their contacts and agendas, creating lock-in effects in the end.

Especially for digital and modular products distributed over digital networks, refinement of products is an even bigger field with vast possibilities for customer integration. Customers no longer need to buy predefined standard products, they can bundle, unbundle or rebundle product modules and recombine the parts to create new individual products, which mainly leads to mass customization again. Customers can for example create their own music CDs or they can search and download single articles from newspapers or magazines. The Internet is often used as a complementary communication channel that allows customers to interact and submit product preferences instantly. Product customization in general comes in many different forms. On computer desktops, the customizability of the user interface (UI), adaptable menus and toolbars are nowadays already a standard. But customization can go even further. For example, in the case of computer games sometimes toolkits are included where players can design their own levels and distribute them over the Internet, hence

raising the product value for other users. Some software packages even contain powerful programming environments where users can automate regular tasks, like for example in the Microsoft Office suite they can create Visual Basic macros or even develop complete and marketable add-ons that can then be sold to other users.

Distribution and Consumption

In the case of digital products and services, customers can also act as distributors or sales promoters. Many Internet companies like for example amazon.com (Associate Program) or 1und1.de (ProfiSeller) already have partner programs where customers can earn a sales premium for each mediated transaction. In the non-digital world it has been common practice for a long time to offer incentives to existing customers to promote products because they have valuable contacts to relatives and friends who might be interested in a certain product or service, too.

The PotatoSystem[23] is an example for an alternative and open system for the distribution of digital music in MP3 format. Customers not only acquire the right to hold a music file but also the right of redistribution. Customers therefore can become resellers either in- or outside of the PotatoSystem and receive a commission up to 35% of the purchase price for further resales down to three levels. The system is customer-friendly because no copy protection or digital rights management (DRM) is applied, while artists and collecting societies like the German GEMA (Gesellschaft für musikalische Aufführungs- und mechanische Vervielfältigungsrechte) receive the biggest portion of the revenues from each purchase.

The final process in the chain is information consumption by the customer. Even if it looks natural that customers play an active part during consumption, this is not always the case. In the simplest case, technical problems may prevent a customer from consumption. Products that are too complex and have faulty or missing instructions may hinder effective usage. Finally, in the case of media products, the customer may consume a product but that does not imperatively mean that he/she understands the information and the message behind the information [Hass, 2002, p. 20]. In the case of complex information products like software, consumption is a time-consuming process of experience and learning that too often requires additional sacrifices from the customers.

[23] http://www.potatosystem.com

7 Customers and Mass Customization

The term ‘mass customization’ was anticipated in 1970 by A. Toffler in his book *Future Shock* [Toffler, 1971], and later coined by Davis in *Future Perfect* [Davis, 1987]. Mass customization is a customer-oriented product or production strategy in which individual customer satisfaction is the paramount objective. It is a special type of customer integration to deal with “market turbulence” [Pine, 1993, pp. 54-55], observable in the increasing fragmentation of former homogenous mass markets. The ‘mass market’ however has always been an artificial construct composed of individuals at heart, only today it is possible to address these smallest segments with ICT and product strategies like mass customization at reasonable costs, hence ICT and mass customization are in fact drivers of mass market fragmentation as they allow an increasing number of companies to offer customizable products to individual customers that can be configured according to customers’ preferences and needs.

Based on the three most important direct measures of mass customization capability: (1) Customization cost-effectiveness, the ability to customize products without increasing production costs, (2) Customizing volume effectiveness, the ability to add product variety without sacrificing production volume and (3) Customization responsiveness, the ability to reorganize production processes quickly in response to individual customer requirements, Tu et al. define mass customization as “the ability to produce varieties of customized products quickly, on a large scale and at a cost comparable to mass-production through technical and managerial innovations” [2004, p. 152]. Information exchanged during the interactive customization process can be the base for a long-term relationship with each individual customer [CeDiS, 2003].

On the other hand, it is clear that mass customization can only partly realize a vision of customer orientation, even when mass customization would be defined as "the ability to provide your customers with anything they want profitably, any time they want it, anywhere they want it, any way they want it" [Hart, 1995].

Tu et al. [2004] contribute an additional model to measure mass customization capability (see figure 17). Though this model was empirically validated only for the manufacturing industry, it is believed here that the model is generically applicable. The study's findings support the hypotheses that not only product and process modularity (besides organizational modularity; not discussed here) positively influence a company's mass customization capability, but also that customer closeness has a positive influence on both modularity and mass customization capability. Tu et al. define customer closeness broadly as "the practice of keeping close contact with customers, to communicate with customers effectively, and to understand customers' individual needs" [2004, p. 150]. Customer involvement (see chapter 8) can suit the action to the words.

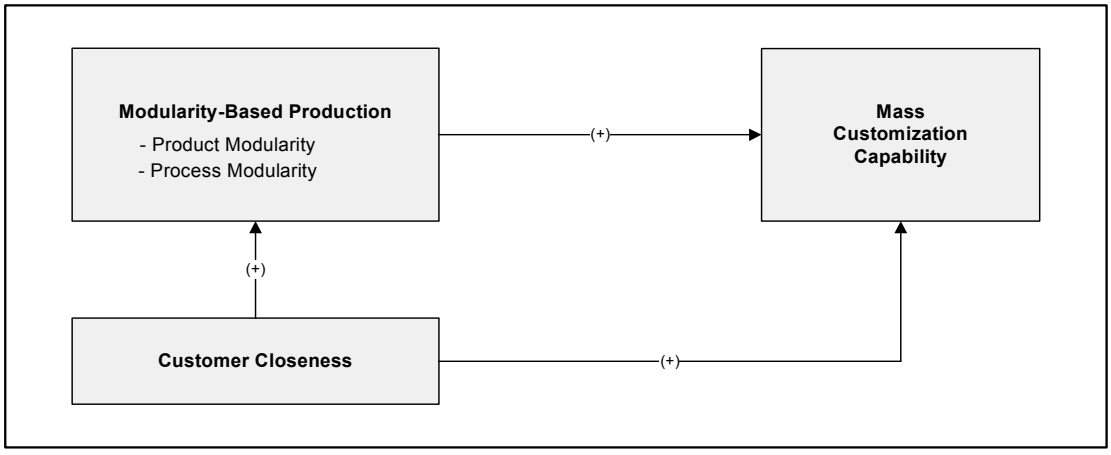

Figure 17. Factors Affecting Mass Customizing Capability
[simplified from Tu et al., 2004, p. 149]

To summarize this introduction, modularity is a strong and well-known enabler of mass customization [see also Pine, 1993; Kotha, 1995; Gilmore and Pine, 1997; Piller, 2003; Mikkola and Skjøtt-Larsen, 2004]. Customer closeness or customer involvement is likely to be an even more important, a complementary method or even a precondition for successful customer integration as it positively influences the production of both modular and customer-specific goods and services.

7.1 Product Customization as a Standard Process

Mass Customization is an interactive process that provides many entry points and a variety of conscious or even unconscious choices for customers. The outcome of the process is a product that matches customer preferences to the highest possible degree. This is the power of mass customization and the value experience for the customer at the same time, interactively producing an industrial product with an individual touch in a short while.

From Standard Products to Customized Products

Technology enables mass producers to create products that are adaptable to individual customer preferences (differentiation option) without significantly increasing variable production costs (cost option). It has often been argued that mass customization is a completely new paradigm that will end the era of mass production [e.g. Pine, 1993, pp. 32-44]. However, standard information products are in many cases seen as being sufficient by a large number of customers. In the case of complex information products, most users will just stick to the standard even if they have the opportunity to customize [e.g. Manber, Patel and Robison, 2000, p. 38]. Other users may want certain options, but few users will need a completely individual product. Mass customization is a supplement of flexible mass production systems rather than a stand-alone paradigm [e.g. Kotha, 1995; Duray, 2002]. In the scheme of things applied in this thesis, mass customization is an incremental innovation of the approved and viable mass production process; it is an incremental process innovation.

Standardization and Customization are extreme points of a continuum [Radder and Louw, 1999, pp. 36-37; Piller, 2003, pp. 145-147; Mikkola and Skjøtt-Larsen, 2004, p. 353]. Lampel and Mintzberg [1996] identify five distinct categories: (1) Pure standardization with no differentiation options (mass production), (2) Segmented standardization with standard products for different customer segments, (3) Customized standardization based on the flexible assembly of standard modules according to customer preferences, (4) Tailored customization with additional customer-specific and individual modules built into the final product and (5) Pure customization (make-to-order). Practical approaches to mass customization need to be a compromise between both extremes.

Gilmore and Pine [1997] propose four different approaches[24] to mass customization: Collaborative, Adaptive, Cosmetic, and Transparent mass customization. Collaborative mass customization is the approach most often associated with mass customization, directing customers to an individual customized product through dialogues where they can articulate their needs and configure a final product by choosing between distinct features (e.g. creating a music CD from single songs). Adaptive mass customization is achieved through adaptive standard products that can dynamically be reconfigured after purchase to fit different situations or needs. Software is typically a broad class of adaptive products. Cosmetic customization presents a standard product differently to different customers. Look-and-feel, style, design and packaging are typical starting points for cosmetic customization, one of the simplest being branding a product with a customer's name. The opposite of cosmetic customization is transparent customization, the most sophisticated approach within these propositions. Transparent customization is basically collaborative customization without collaboration. The customization process happens transparent to the individual customer; customers' needs are rather predicted and deduced from the observation of customers' behavior. Intelligent products that customize themselves during usage are the result. Appropriate technology is still in its infancy but fast developing. Location-dependent mobile services, ubiquitous computing or the transparent recommendation system at amazon.com are some examples. Transparent customization can relieve customers from sacrificing time and effort in order to configure a complex product. Transparent customization and any of these four approaches may also be combined at last.

Product Customization and Customer Profiles

Customer profiles are needed to learn about customer preferences in order to improve future interactions (economics of learning). This is the most true for approaches like transparent customization and personalization. Besides the production of individual goods, individual marketing (or one-to-one marketing) enjoys growing support by practitioner and academics. Approaches that focus on individual customers share the

[24] A thorough summary and review of different approaches proposed by Pine and Gilmore (1999), Duray et al. (2000), Piller (2000), Da Silveira et al. (2001) and MacCarthy et al. (2003) can be found at [Blecker et al., 2005, pp. 12-23].

same fundamental idea and therefore should go hand in hand [Piller, 2003, p. 152; Pitta, 1998, p. 469]. In the case of digital information products, both approaches even share the same technological base that only splits up when it comes to physical reproduction and distribution. Pitta states that one-to-one marketing – like mass customization of digital information products– is made possible by three technologies [1998, p. 479]: customer databases, interactive media, and systems that support mass customization. Customer databases contain customer profiles, the complete collection of customer-specific information and history of interactions (to consider time and actuality) that can be used to create an individual customer preference model[25]. Customer profiles can make the customization process easier for customers, but privacy issues have to be considered. Preconfigured but easy adaptable solutions, recommendation systems and really intelligent[26] configurators and products respectively (that are able to observe customers' interactions and predict their current or future needs with high certainty) are some advantages of customer profile usage that can make the process of product customization half the value experience for customers.

7.2 A Customers' Needs Model

Based on the general information needs model [e.g. Picot and Franck, 1988, p. 609; Picot and Reichwald, 1991, pp. 275-276; Blecker et al., 2005, pp. 63-65] that stems from information theory, Blecker et al. introduce a customers' needs model for mass customization (see figure 18). The general information needs model describes that information demanded by an individual in order to complete a given task is a subset of his/her subjective information needs. Objective information needs usually extends the set of subjective information needs because objective information are information an individual would need to solve the task but is not yet aware of. On the supply side, the available information supply further limits the satisfiable part of information demand. Therefore, the intersection of all four sets (subjective and objective needs, demand and supply) determines the information level that an individual can actually use for task completion, which is often only a small part of the information demanded.

[25] Based on [CeDiS, 2003]: definition of a user profile (in German).

[26] Unfortunately, false prediction of needs, unexpected 'intelligent' behavior of machines and user annoyance are often close together in reality [e.g. Manber, Patel and Robison, 2000, p. 37].

Blecker et al. [2005, pp. 64-76] adapt the general model to the product selection task during customer interactions in mass customization. In contrast to the original information needs model, their model is a cumulative model that describes the needs of all customers and not only the needs of an individual customer. First of all, Blecker et al. argue that information demand and subjective needs entirely superpose for the product selection task, because the subjective customers' needs are "the individually realized and articulated requirements" [2005, p. 67] and therefore are the explicit needs actually communicated during the interaction with various customers. On the other hand, the implicit or objective customers' needs are "the real ones perceived by a fictive neutral perspective" [Blecker et al., 2005, p. 67]. Blecker et al. assume that with mass customization, customers can collectively articulate their complete subjective needs, whereupon individual customers can actually demand a product that satisfies most or all of their subjective needs.

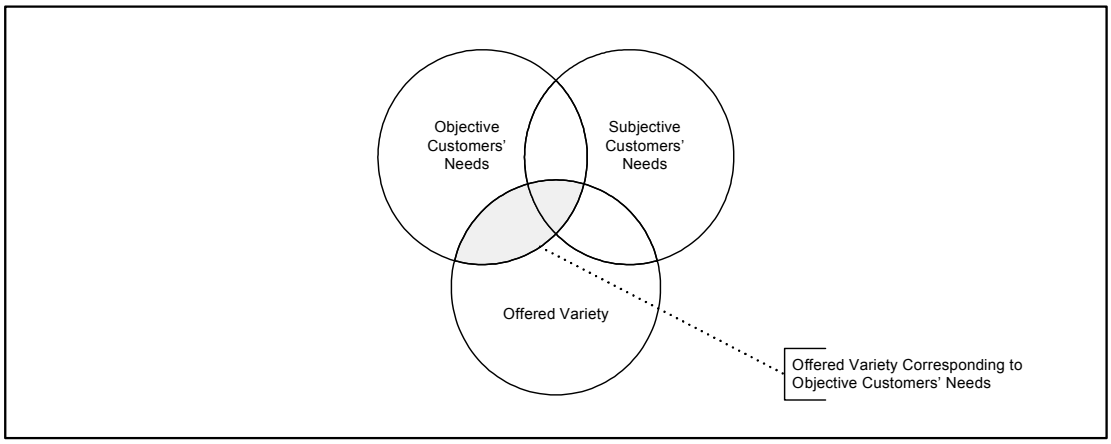

Figure 18. The Objective and Subjective Customers' Needs Model [Blecker et al., 2005, p. 66]

By using methods of customer involvement (see chapter 8) like customer interviews or conjoint analyses, companies can relatively easy find out about subjective customers' needs, and companies can adapt the products they supply (offered variety) to these needs. Hence, they know about subjective needs and the variety they offer [Blecker et al., 2005, p. 66]. Only the objective customers' needs are hard to capture, as customers are often unable to express their needs completely and moreover, "customers are generally unaware of their requirements until they see them violated" [Blecker et al., 2005, p. 66]. The objective customers' needs however are the real needs of customers, even if customers often are not aware of this.

The general task of a mass customization company is to make offered variety and objective customers' needs as congruent as possible. The space of intersection between objective customers' needs and offered variety is the key to real customer satisfaction (see figure 18). Over and above that, companies can even help individual customers to discover additional parts of their objective needs that are covered by offered variety. Mass Customization can enable customers to satisfy information needs they were not even aware of. An example may again be the transparent recommendation system at amazon.com that sometimes proposes additional products to customers related to objective needs they may not even be aware of. When a customer arrives with subjective needs in mind, and he leaves with a product that satisfies his implicit objective needs he has not even been aware of before, this can in fact turn the unemotional customization experience into a true value experience.

7.3 Value Experience

The book *Priceless* by Diana LaSalle and Terry A. Britton [2003] is about the concept of viewing consumption of every product or service as an extraordinary experience, not just as a single event or decision. In the book, they use the term 'value experience' for this consumption process. In their perspective, not only the product but also everything that surrounds it has only one function: to signal value to the customer. The actual purchase is only a small detail in the complete process. In the case of information products that are experience goods anyway, customers often don't buy the product; in the case of a DVD they may buy hours of entertainment and fun with friends, in the case of an computer game they may buy an adventure, in the case of an online business magazine they buy professional success, in the case of software they buy a durable solution to an individual or even corporate problem, they buy presents and prospects of social interaction.

Value first of all is determined by the customer. Value is in the eye of the beholder. Only the customer can determine what value he/she finds in a purchase [LaSalle and Britton, 2003, p. 7]. This is why differentiators are all different. They hope and try everything so that customers like their products the most, for whatever particular reason. The foundation of experience is interaction with each individual customer, and interaction causes reactions, either positive or negative ones [LaSalle and Britton, 2003, pp. 29-30]. Both components together form a value experience.

For mass customization, the mass customization experience with customer rewards and sacrifices is depicted in figure 19. The most important customer benefit of mass customization is the outcome: products that satisfy individual needs. Usually, satisfying subjective needs is relatively easy due to previously discussed reasons. Still, this is better for a customer than a standardized mass product that satisfies the needs of a whole customer segment by delivering only a mean value for all segment members [Piller, 2003. pp. 145-146]. The real customer value however arises from a product that satisfies objective needs. Products that satisfy objective customer needs, especially objective needs customers may not even be aware of before the mass customization process, can lead to a really priceless mass customization experience.

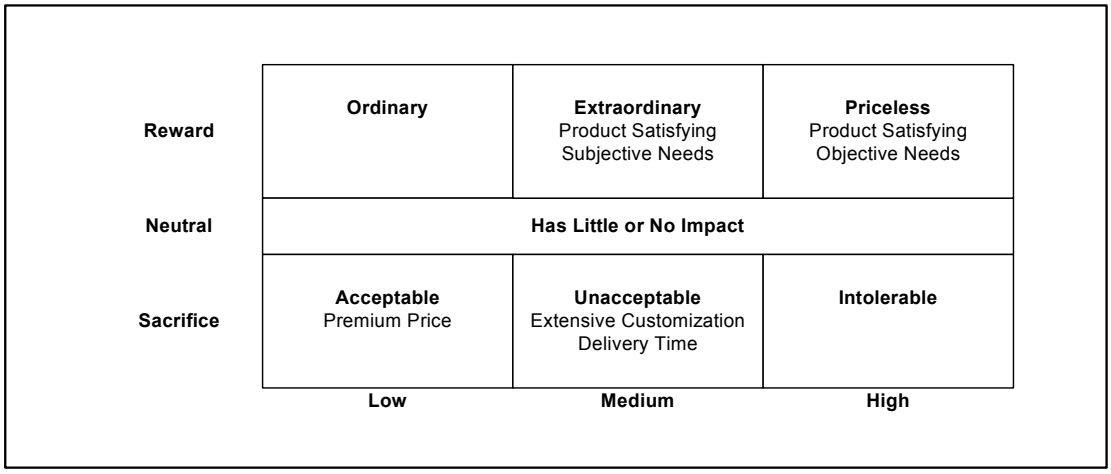

Figure 19. The Mass Customization Experience [based on LaSalle and Britton, 2003, p. 41][27]

Bardakci and Whitelock name the three major inconveniences (sacrifices) of mass customization a customer usually can face [2005, p. 398]: customized products are more expensive than standard products, customized products may not be available instantly after the purchase due to postponed production or assembly, and the interactive design of a customized product is often time consuming and difficult. To deliver a priceless value experience, companies can try to turn sacrifices into rewards or at least into neutral factors that have little or no impact on final customers' judgments [LaSalle and Britton, 2003, pp. 41-42]. Studies like the one by Franke and Piller [2004] indicate that customers often accept a premium price for a premium

[27] ACE Matrix developed by MacMillan, I. C. and McGrath, R. G. (1996) "Discover Your Products' Hidden Potential". *Harvard Business Review*, May-June 1996: 5

product. Pricing a product according to its value perceived by individual customers instead of actual costs is often proposed for information products [e.g. Choi, Stahl and Whinston, 1997, p. 65; Shapiro and Varian, 1999, pp. 3-4].

Unacceptable sacrifices like delayed delivery can in the case of purely digital information products easily be neutralized by offering an option for digital download. The sometimes extensive effort of customization can be neutralized or even turned into a reward with intelligent configurators or product advisors, transparent customization or similar means that help customers to find out about their real, objective needs. A simple straightforward series of mandatory choices between distinct product features is often not the optimal way to implement a customer-orientated mass customization experience. Offering a few preconfigured standard variants that can be customized at will may be a better starting point.

Some final words need to be said about mass customization, value experience and competitiveness. Customizable products and services with their 'surprise and delight' nature[28] can significantly enhance a business unit's ability to gain new customers and retain existing ones [Kelly, 1994, p. 88]. When many customers buy different products from a company, customer loyalty can be further increased. The reason is that, based on the accumulating knowledge about individual customers inside the company, the business unit is able to make further incremental improvements to existing products and services so that they even better fit to newly discovered or changing (objective) needs. With these unique core products or services together with its unique knowledge about its customers and their individual needs, a company can successfully differentiate itself from competitors. In order to remain competitive, customer-oriented business units must continuously listen to their customers while adapting to their needs at the same time.

[28] Surprise and delight might arise from the discovery of afore unknown objective needs – either before, during or after the purchase – that can be satisfied by a customizable product.

Part III

CUSTOMER INVOLVEMENT IN THE PRODUCT LIFECYCLE

8 Customers and New Product Development

Customer involvement is a possible source of innovation for existing and also for new products. A sound definition of customer involvement could not be found in literature; often customer integration and customer involvement are not clearly distinguished or used interchangeable. Therefore, based on the work of Tu et al. [2004] and Blecker et al. [2005], customer involvement will be defined in the following as a method to support the task of a company to understand individual customers' or markets objective and subjective needs, and to adapt products and services so that these products and services will better satisfy identified objective needs. The goal of customer involvement is the creation of marketable solutions or the improvement of customer-specific solutions. In simple terms, customer integration is the integration of the customer in the daily process of producing goods and services, which is closely connected with the supply chain concept, while customer involvement is the involvement of customers in the parallel innovation process for new or existing products, which is closely connected with the lifecycle concept. Customer integration and customer involvement need to be clearly distinguished because both methods serve different purposes.

What customer integration is for the supply chain, customer involvement is for the product lifecycle – a method to implement customer orientation in the product lifecycle. Customer involvement is a complementary method to customer integration. Customer integration rather deals with process efficiency along the supply chain, while customer involvement deals with product effectiveness. Customer integration enables customers to interact with a system on the base of daily operations. However,

customer integration is a static concept against the background of product innovation. Customer integration itself is an incremental process innovation, but once implemented, the products need to become the center of attention of every customer-oriented strategy (again).

It is argued here that every viable customer-oriented system needs some eyes and ears to listen to the market and its customers, and not only to its current but – even more important – also to its prospective customers. If it is true that mass markets become more and more fragmented, customer's needs are changing over time, market turbulence is increasing and competitors are also improving their products, what use is a customer-oriented system that does not constantly incorporate customers' changing needs into its products and services? Therefore, the monitoring of environmental changes is an important ingredient of a customer-oriented strategy.

Customizable products for example need to be the result of monitoring methods like customer involvement, because customers have subjective and objective needs, and products that don't adequately satisfy any of these needs simply will fail in the market. This is one of the everlasting business rules Shapiro and Varian meant when they wrote "Technology changes. Economic laws do not." [1999, p. 2]. Mass customization only for the sake of technology will fail; mass customization for the sake of the customer has significantly better chances of success. Customization should not be implemented because it is possible, but because customers express a need for customizable products, as demand is the driving force in mature markets, not supply.

If customers' needs are not considered appropriately, mass customization can even become a trap. Unwanted variety that neither satisfies objective nor subjective customers' needs – large parts of the offered variety in figure 18 – is of no use to anyone and has to be eliminated [Blecker et al., 2005, pp. 68-78]. Similarly, Utterback wrote that "mass customization may also be a trap resulting in products with little commercial potential and in unwanted product variety" [1994, p. 99].

New product development is one of the major processes of business [Schary and Skjøtt-Larsen, 2001, pp. 23-24] and the first of three main periods in the life of a product at the same time (see figure 7). In the new product development process, new products are born out of an idea and probably manage to proceed to market introduction. This first period is followed by a period of life on the market (chapter 9). At some points in time, existing products may need to be retired or revitalized (chapter 10), often because of environmental change leading to decreasing sales.

8.1 Success Factors of New Product Development

The continuous development and market introduction of new products can be an important determinant of sustained company performance and a source of competitive advantage [Brown and Eisenhardt, 1995, p. 344; Ernst, 2002, p. 1]. In 1995, Shona Brown and Kathleen Eisenhardt published a top-level literature research that synthesized empirical findings about factors that affect the success of new product development projects from the previous decades into a consistent model (see figure 20). In Brown and Eisenhardt's words, "this model highlights the distinction between process performance and product effectiveness and the importance of agents, including team members, project leaders, senior management, customers, and suppliers, whose behavior affects these outcomes" [1995, p. 343]. Due to limited space here, it will be focused on the findings about customer involvement, whereas for a complete discussion of the model a reference to the original article is given.

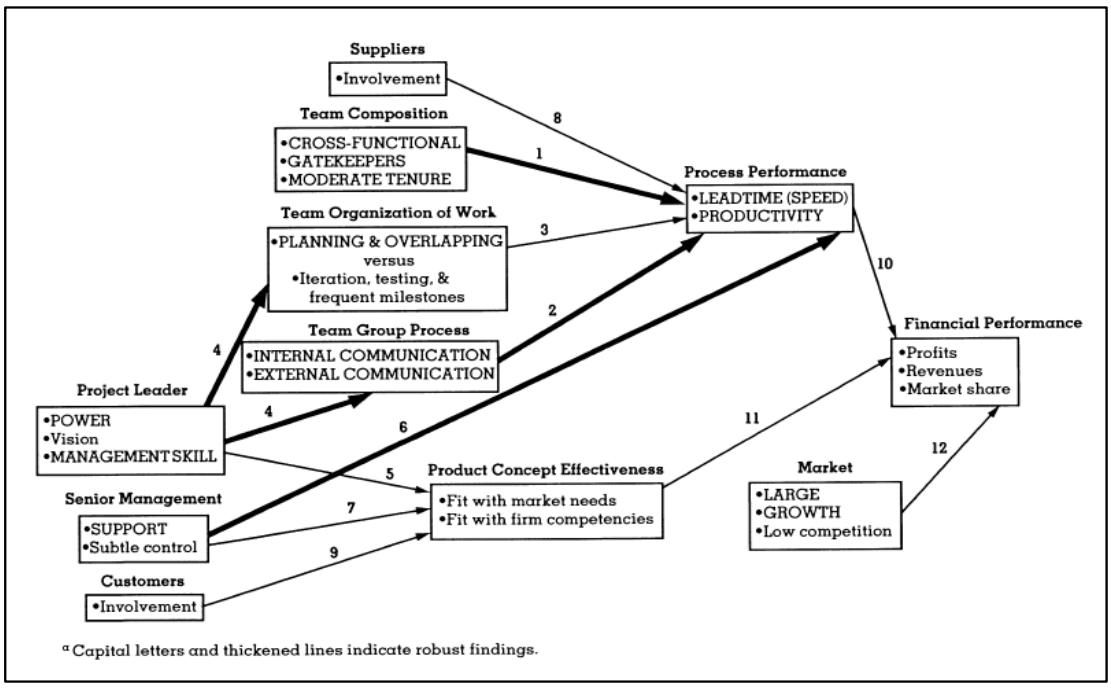

Figure 20. Factors Affecting the Success of Product-Development Projects[α]
[Brown and Eisenhardt, 1995, p. 346]

As the thin line between customer involvement and product effectiveness indicates, customer involvement is no clear success factor of new product development. Brown and Eisenhardt state that even though some studies show that

customer involvement can improve product effectiveness, it has to be asked when and how exactly customers should be involved [1995, p. 371-372]. The first question (when) will be discussed in chapter 8.3, the second one (how) in the following.

Holger Ernst states that market orientation is important for the success of new product development [2002, pp. 3-8]. Intense concentration of new product development on a few customers however can have a negative effect on success, especially for breakthrough products[29].

> "Obviously, 'market orientation of the NPD process' and 'customer integration [customer involvement] into new product development' are two distinctively different aspects. The latter need not always have a positive influence on the success of new products (Brockhoff 1997, 1998)."[30]

In this thesis it is argued that market orientation and customer orientation have not only to be distinguished in NPD processes, but also on the superordinated level of business strategy (see figure 16). The reason is the inherent (but probably not rigid) trade-off relationship between breakthrough innovation and customer orientation.

For NPD projects that deal with breakthrough product innovation (new-to-the-market products), customer orientation often cuts both ways. In order to achieve incremental innovation of mature products however, customer orientation and involvement is an appropriate method to find out about customers' subjective and objective needs. For breakthrough projects, customers are rather a source of information about present or even emerging market needs (samples), not about individual needs. For incremental improvements, e.g. in the context of mass customization, customers in their natural role as demanders can be one of the best available sources of information about their own individual needs.

Besides the customer role as a demander, Brockhoff names four other customer roles[31] that can be subsumed under the keyword 'pilot customers' [1997, pp. 357-359]. The application of such roles seems to be appropriate even for some breakthrough projects, because in these roles customers act rather as specialists than as customers and can reveal valuable information. However, up to now these

[29] This may differ for B2B and B2C relationships, e.g. for large key accounts vs. individual consumers.

[30] [Ernst, 2002, p. 8]; see also [Brockhoff, 1997]

[31] Namely Launching customer, Lead user, Reference customers and First buyer; concerning lead users, see also [von Hippel, 1986; Foreman, 2003; von Hippel, 2005, pp. 19-31].

'advanced' customer roles often provide more question marks than answers, findings are unstable, preconditions have to be met and constraints exist, so that these concepts need to be evaluated for each isolated case. They might play a role for producers of high-priced goods and rather in B2B relationships than in B2C relationships. In this thesis, they will not be discussed in depth.

Companies applying the method of customer involvement in order to achieve breakthrough product innovation basically have to beware of the inherent trade-off relationship between both. A combined approach may be connected with high search costs, high risk and a probably worthwhile but uncertain outcome, as reaching a vision of breakthrough innovation often requires much more effort than implementing customer orientation (supported by the means of ICT if this has to be emphasized).

8.2 Open and Closed Innovation

In his article *The Era of Open Innovation*, Henry Chesbrough [2003] argues that a fundamental shift is taking place how companies generate ideas and bring them to the market. The 'old' closed innovation mode – controlled in-house generation, development and commercialization of own ideas – can be reinforced by an open innovation mode. In open innovation, a company commercializes both its own ideas as well as innovation imported from the competitive environment. Breakthrough ideas from the inside can for example be commercialized by small innovative start-ups or spin-offs, where these ideas are more likely to survive and reach new markets that are up to now not the core business of the company, while ideas from the outside can be imported and further developed inside a company, e.g. through licensing or even through sponsoring or acquisition of innovative market entrants, as the boundaries of companies become more permeable in the open innovation mode.

Additional Areas and Sources of Innovation

In between open and closed innovation lies a continuum of possibilities [Chesbrough, 2003, p. 37]. Chesbrough names the movie industry as an example for an extremely open industry:

> "At the other extreme, some industries have been open innovators for some time now. Consider Hollywood, which for decades has innovated through a network of partnerships and alliances between production studios, directors, talent agencies,

> actors, scriptwriters, independent producers and specialized subcontractors (such as the suppliers of special effects). The mobility of this workforce is legendary: Every waitress is a budding actress; every parking attendant has a screenplay he is working on."[32]

Open innovation means to break with the 'not invented here' mentality [e.g. Brockhoff, 1997, pp. 366-367; Chesbrough, 2003, p. 38] common in many industries and large companies. If companies ignore outside innovation, customers will then buy the products where they have been invented; and few customers mind if it is here, or there. "In fact, companies often get trapped in their earlier success" [Meyer and Utterback, 1993, p. 35] when they miss a new cycle of breakthrough innovation often initiated by new market entrants. Tushman and Anderson [1986] distinguish between rather seldom events of competence-destroying (breakthrough) product or process discontinuities initiated by new market entrants that often create disadvantages for established organizations which have been improving their competencies in regard to preceding products or processes for years or decades, and competency-enhancing (breakthrough) discontinuities that usually work in favor of established companies as they are based on existing skills and knowledge and are most often initiated by established industry members as well. A finding of their study in the airline, cement and minicomputer industry is that "While dominant technologies cannot be known in advance, those firms that recognize and quickly adopt a technological breakthrough grow more rapidly than others" [Tushman and Anderson, 1986, p. 459].

A study by Linder, Jarvenpaa and Davenport [2003] among 40 companies in 5 industries reveals that on average, 45% of the amount of innovation can be estimated to come from external sources. For some retail companies, that figure was up to 90%. Linder, Jarvenpaa and Davenport also warn of what they call 'product myopia', and in one breath also name Services and customer experience, Business processes, Production processes, Technology development, Business models, Lines of business, Store design and Packaging as further potential areas for innovation.

Potential sources for either breakthrough or incremental innovation are suppliers, competitors, new market entrants, research companies, business partners, universities, employees and current or potential customers. A rather common model of open innovation is for example the licensing of standard business processes in the

[32] [Chesbrough, 2003, p. 37]

form of standard software by specialized vendors like Microsoft, SAP, Oracle, IBM, Adobe and others. These processes promise incremental or even breakthrough process innovation to a corporate customer. Standard software vendors offer standard solutions that can be customized and adapted to specific customers' needs, and in the best case the purchase of standard software means to purchase incremental or even breakthrough process innovation.

Customer involvement, like supplier involvement on the 'other side' oft the company, is a method of open (product) innovation. Customer involvement, like customer integration in the supply chain, is a generic term that comes with many faces. Examples are customer surveys, customer panels[33], customer workshops, innovation communities, product tests carried out by customers, monitoring product usage, feedback forms[34] or any other means whereby current or potential customers can interact with product development or product management and submit their individual needs. All these different methods to gain customer feedback can yield new ideas for new products or features and can be used to identify and remove unwanted variety as well. In contrast to mass customization in the supply chain, where the reward is – often instantly – a customized product with a personal touch, customers might need some additional incentives or rewards to reveal their needs and participate in the innovation process, as the time between interaction and an offer that satisfies these needs is usually much longer.

Internet Innovation Communities

Internet innovation communities are an example of customer involvement, not only in the information industry. According to von Hippel, innovation communities are "meaning nodes consisting of individuals or firms interconnected by information transfer links which may involve face-to-face, electronic, or other. These can, but need not, exist within the boundaries of a membership group" [2005, p. 96]. Innovation communities are a subset of communities and are based on innovation in single nodes whereas information about these innovations is freely revealed. Von Hippel also introduces the concept of 'sticky information', information that is costly

[33] Anderson et al. [2002] describe a British Telecom customer-centered panel research.

[34] Michael Dell [1994] for example describes the importance of Dell's feedback system for continuous incremental innovation in a mass customization company.

to transfer from one node to another [2005, pp. 66-67]. An example of sticky information is tacit information that is not explicitly expressed, like objective customers' needs have a high stickiness, i.e. are costly to identify and hard to transfer from the location of needs (customers) to the satisfiers of these needs (companies).

The case of open source software is a phenomenon where users themselves innovate without the involvement of companies because they face own and individual unsatisfied needs. Especially for information products where both information and products can be easily transferred over networks like the Internet, information companies are not imperatively needed in the community [von Hippel, 2005, p. 126]. Besides observing or even taking part in such independent innovation communities, companies can exploit knowledge and potential network effects in communities by creating innovation communities themselves to induce innovation of their own products. The combination of information communities, support communities and innovation communities open for current and prospective customers on the Internet is a possible way to go[35]. Freedom of speech, user-to-user communication and easy access for both current and prospective customers are some important success factors of such communities. Especially the analysis of customer criticisms and questions as well as the involvement of prospective customers (that usually have a wish list and knowledge about competitive products' features in their head) can give hints about possible product improvements.

At the end of this chapter, it can be said that especially in the context of customer-oriented strategies, an outside orientation of respective business units is a crucial factor of success. An open innovation mode can lead to a tactic that in short can be called a 'tactic of fishing pearls at the outside while growing oysters inside' simultaneously. As both breakthrough innovation and incremental innovation occur certainly and even most often outside a company, open innovation is a good ingredient of every business strategy in general, no matter if it is customer-oriented or a innovation-oriented one. When the primary objective is breakthrough innovation, more sophisticated methods like the lead user concept may be needed, and sources of innovation have to be selected more carefully. Still, chance and timeliness play an important role in breakthrough innovation.

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[35] Tietz and Herstatt [2005] provide a case study about two company-owned customer communities, namely the Club VAIO, Sony's brand for personal and mobile computers, and the DELL community.

8.3 Involve Customers in Early and Late Stages

Continuing from chapter 8.1, the question was where customers can best involved in the product development process. Gruner and Homburg [2000] were among the first who examined if the involvement of customers at different stages in the development process yields different performance. Their study in the Germany machinery industry, although limited to a certain industry and class of products, indicates that this assumption is true. Even if findings from this study can only transferred to the information industry with caution, it seems reasonable to limit customer involvement to specific stages to minimize interaction costs and product development time. Gruner and Homburg use a six-stage process model (Idea generation, Product concept development, Project definition, Realization, Testing and Market launch) that is similar to the process model Köhler [2005, pp. 84-88] developed for specifically for the media industry. Gruner and Homburg's study indicates that the involvement of customers in early (idea generation and concept) and late (testing and launch) stages of the process has a positive effect on the performance of the project, while customer involvement in the more technical definition and realization stage yields non-significant results. The most significant effect can be measured in the testing stage, where prototypes can still be improved before the final market launch. Gruner and Homburg measured that the effect of customer involvement in the concept development stage is higher than in the idea generation stage [2000, p. 10]. They argue that customer information is more valuable in stages that are more concrete.

The findings of Gruner and Homburg may serve as a guideline for the information industry. When evaluating the benefits of customer involvement in NPD, a distinction between breakthrough and incremental innovation has to be made. Customers unfortunately are seldom the source of breakthrough innovation. In order to achieve breakthrough innovation, it seems to be better for a company to rely on own capabilities and combine these capabilities with methods of open innovation. In the context of breakthrough innovation, customers are rather samples to reveal current or future market needs. The highest outcome might be achieved when customers are involved to evaluate concepts of new information products or to test these products before the market launch. Here, customer involvement can yield incremental improvements. The highest potential of customer involvement however lies not in new product development, but rather in the later stages of the product lifecycle.

9 Customers and Product Management

Linda Gorchels defines Product Management (PM) as "the entrepreneurial management of a piece of business (product, product line, service, brand, segment, etc.) as a 'virtual' company, with a goal of long-term customer satisfaction and competitive advantage" [2003, p. 2]. Product managers are generally accountable for this piece of business, and product management may include, but is not synonymous with project management, new product development, or sales support. Handscombe takes a more functional perspective. He sees product management as an integrative approach between the business functions of Product design and development, Marketing, Production and aftersales service and Sale and delivery [1989, pp. 3-5]. As a last example, Harry M. Sneed, Martin Hasitschka and Maria-Therese Teichmann, based on Zvegintzov[36], even put product management on a level with lifecycle management of a product, from birth to death [2005, pp. 2-3].

In this thesis, product management will be seen as an operational part of a business unit that manages a given product, product line or brand, and for simplification reasons a diversified company with three central business units will be examined in the following (see figure 21). Even if it might be debatable in portfolio theory, the postulation of homogenous business units, e.g. products or product lines at similar stages in their lifecycle, seems to be useful for the manageability of business units. Independence is another design principle for business units [e.g. Schneck, 1994, p. 645]. A business unit may also contain several products or product lines, as long as they are homogenous.

[36] Zvegintzov, N. (1987) "Immortal Software". *Datamation*, Sep 1987

Further (incremental) innovation and support of existing products are some of the objectives when managing the products' period of life on the market (compare to chapter 3.1). Even after a successful launch, the development of most information products does not stop. Some products like software or Internet services usually evolve rapidly during the growth stage till maturity, while others like books or music are never or only in the case of extraordinary success published as revised versions. However even these products can be mass-customized and distributed over digital networks. Other periodical media products again appear regularly with new content, while the inner and outer form may be adapted to market or customers' needs over time.

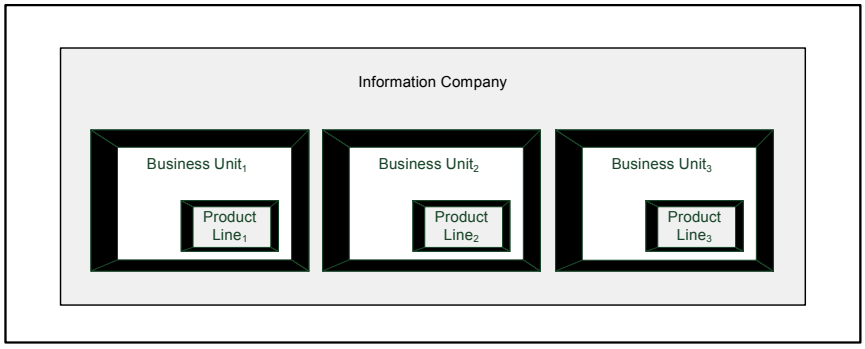

Figure 21. An Example Company

Like already discussed for the NPD process, customer involvement as a method of open innovation can yield incremental (product) innovation. If a new product survives the critical launch stage, it is usually the task of the product manager to ensure continuous growth in sales and to support sales through coordinated marketing activities. Parallel to these daily operations, product managers need to perform market sensing. For young products, both closed and open innovation are appropriate means to foster further improvements, and possibilities to do so are often abound. However, when products mature and innovation rates slow down, the involvement of individual customers in the innovation process, in combination with customer integration becomes increasingly important. Both methods together can lead to high satisfaction of current customers, and these methods can especially be used to find out about prospective customers' objective and subjective needs. Nearly every information product can end by being modularized and customized in order to support multi usage and better fulfill individual customers' needs.

9.1 The Business Unit Lifecycle

Based on the general diffusion theory of technology [e.g. Onkvisit and Shaw, 1986; Marr and Picot, 1991, p. 682; Norman, 1999], the evolution of a business unit will be discussed in this chapter. Diffusion theory describes the adoption of innovation in social systems [Marr and Picot, 1991, p. 682]. Like depicted in figure 22, diffusion theory – closely related to the lifecycle concept – describes how technology or breakthrough innovation in general is adopted first by innovative customers, then by early adopters, later by the early majority and finally by so called laggards. These different customer groups expose different needs, and network effects and positive feedback can play a role in this adoption process, too. Notice the chasm between early adopters and the early majority is a critical transition point that decides if an innovation will be largely adopted, or if it will fail early. Norman argues that this point is crucial for computer technology, as all technology has a lifecycle, and during this lifecycle, user segments vary as described, and not the early adopters, but the early and late majority (late adopters) form the mass market [Norman, 1999, pp. ix-x and 32-33]. He argues that this point is the point when base technology fulfils the basic needs of an average user. For further innovation on the right side of the chasm, technology shows sufficient performance and becomes irrelevant; user experience and convenience therefore dominates on the right side [Norman, 1999, p. 32].

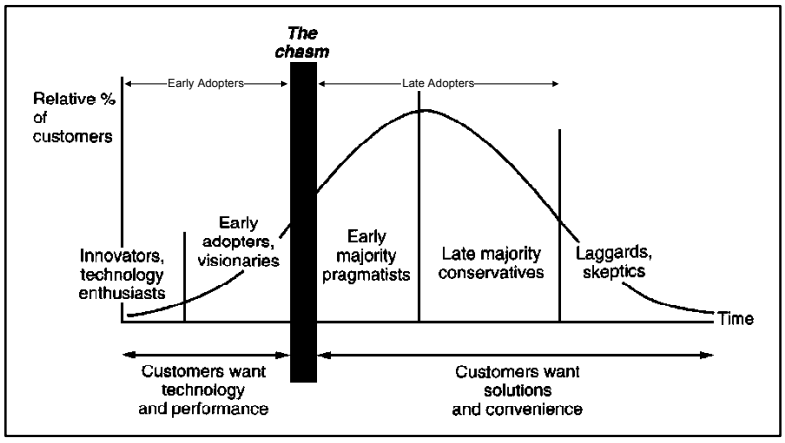

Figure 22. The Change in Customers as a Technology Matures [Norman, 1999, p. 33 and 35]

It is argued here that for a strategy for the management of information products, the chasm is crucial, too. Looking at business strategy, the two basic options

are innovation or adaption. At this transition point, business strategy has to change. It can be changed later, the latest when sales decline, as this one possible indicator easy to detect but probably too late when facing fierce competition. At some point in time however, innovation orientation that deals with young products and mainly targets segments of early adopters is to be transformed into a customer-oriented strategy that is targeted at the majority of late adopters. Under the precondition of homogeneity and independence of business units, business units can share the lifecycle of their products. They have a youth, when (breakthrough) innovation is important. And they have an early and late maturity (or growth and maturity stage), when customer orientation becomes increasingly important[37].

The Evolution of a Business Unit

Portfolio theory implicitly assumes that business units as well as markets evolve. They are established around core products, they evolve from question marks to stars, and at later stages they may become cash cows and eventually cease to exist later because of shrinking markets and market shares [e.g. Haertsch, 2000, pp. 50-52]. Business units don't die in any case; sometimes they can reach an equilibrium state, a state of extended maturity [e.g. Baker and Hart, 1999, p. 22]. Agricultural goods or goods of daily consumer needs for example usually meet a stable demand. However, most information products are luxury products. It is clear that business units capable of adjusting to environmental changes are more likely to survive significantly longer than static ones.

Surely, like every simple concept, portfolio approaches have been criticized to be too simple [e.g. Haertsch, 2000, p. 52]. Surely, portfolio approaches are too simple when they are regarded as the ultimate and only guarantee of success. Portfolio approaches don't replace independent thinking and responsible behavior of managers. They are however useful guidelines for the modularization of a company, closely connected with the profit center concept [e.g. Picot, Reichwald and Wigand, 2003, p. 242]. Profit centers are independent business units often grouped around products or product lines. Therefore, it is recommended here to group young innovative products

[37] Norman, in regard to simplification, adds: "Oversimplifications are useful if they capture the essence of a phenomenon. The distinction between early and late adopters may be oversimplified, but I have found that it resonates with people all around the world. It captures well the changes in attitudes about a technology as it matures and becomes integrated with a society's culture" [Norman, 1999, p. 33].

and mature adapted products in different business units to achieve manageability, accountability, economies of scope (e.g. through common product platforms or similar marketing) and first of all, to be able to pursue a clear (unambiguous), common business strategy per unit.

Taking up the idea of diffusion theory, business units are a bistable system with innovation orientation and customer orientation as the two stable states. The evolution of an exemplary business unit is depicted in figure 23. The figure only depicts two operational subunits, namely product development and product management. Other operational units like production, marketing or sales are not depicted for complexity reasons.

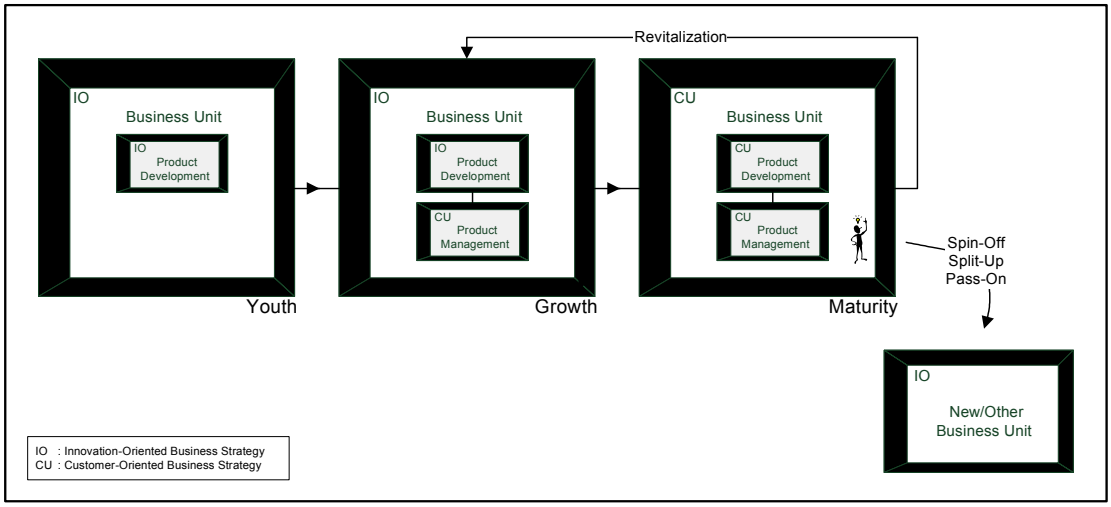

Figure 23. Evolution of an Exemplary Business Unit

Business units are usually born in innovation mode. The example business unit depicted has a subunit of product development with inherited innovation orientation, working on an innovative product or product line (compare to figure 21). To support further growth, product management plays an important role. Product management was first used by Procter & Gamble in 1927 [Strieter et al., 1997, p. 128] and since then enjoyed growing popularity in diversified companies. Product management is a means to incorporate market sensing in the business unit, and many authors stress the interface function of product management, acting as “the customer advocate in the organization” [Gorchels, 2003; p. 11] and coordinating different operational units. Therefore, a communication channel is drawn between product development and product management in figure 23. When products mature and innovation in an

industry stagnates, it can be recommended to shift to a customer-oriented strategy, and to focus on satisfying changing customers' needs because the needs of the late adopters on the right side of the chasm – representing the largest part of a market – may differ significantly from the needs of the early adopters on the left. As a direct consequence, product development for mature products needs to become customer-oriented as well, not any more targeted at an anonymous market of early adopters, but at individual and heterogeneous needs of the majority of the late adopters.

Punctuated Equilibrium

The evolutionary model of the punctuated equilibrium introduced here was empirically validated by Romanelli and Tushman [Romanelli and Tushman, 1994; Katsanis and Pitta, 1995] According to Romanelli and Tushman, "Organizations do not evolve through a standard set of stages […] [they] evolve through convergent periods punctuated by strategic reorientations or recreations, which demark and set the bearings for the next convergent period" [1994]. In other words, long periods of equilibrium and incremental innovation are punctuated by rather short periods of radical or breakthrough change. Baker and Hart support this theory when they write that "Few companies compete consistently through innovation" [1999, p. 34]. Applying this theory on the view on business strategy used in this thesis, this means that the periods of innovation orientation often are not more than only short punctuations of a long-term customer orientation. Therefore, an infinite loop between growth and maturity of the business unit is introduced in figure 23. In connection with the leftmost stage (youth), the model also expresses that the initial innovation orientation of a young business unit may last longer than later temporary strategy shifts from customer orientation to innovation orientation in mature business units.

Breakthrough Innovation and Customer Orientation

When a mature business unit itself makes an important invention that it believes can become a breakthrough innovation or decides to commercialize e.g. a breakthrough idea, the unit basically has four options:

- If the innovation benefits all products of the business unit, e.g. if it is a common process innovation or an organizational or product architecture reorganization, the business unit can shift strategy from customer

orientation to a temporary innovation mode to implement the innovation on its own (revitalization).

- If the breakthrough innovation doesn't match the current product portfolio, the business unit can externalize the innovation by either passing responsibility to another existing (innovative) business unit, by splitting off a new innovative business unit or by creating an independent spin-off or start-up company. Especially the last option is common practice for commercialization of innovative technologies, not only in the information industry.

If the breakthrough innovation occurs outside a business unit in its industry and affects its business, it may be forced to change to innovation mode to react to this innovation or to adopt it in its products or processes. Therefore, either internal or external factors can influence the change from customer orientation to innovation orientation or vice versa. For the music industry for example, the emergence of illegal music exchange over peer-to-peer (P2P) networks can be seen as a threat, and as an external breakthrough innovation that endangers the industry's traditional distribution processes and forces companies in the industry to switch to innovation mode while reconsidering their business models.

Finally, the strategy proposed in this chapter is no simple cookery book recipe, but a strategic pattern built on validated theory. This pattern is also observable in practice, most often as a reaction to external change. Examples from practice are reorganization projects (breakthrough process innovation respectively[38]) in consequence of severe financial crises, even though it is certainly better to induce breakthrough innovation in a planned way, before a crisis occurs.

9.2 The Source of Incremental Innovation

Returning to customer involvement in product management, the basic trade-off relationship between innovativeness and customer involvement will be discussed next. Incremental innovation as a response to current and observable needs is easier to

[38] VanHoose explicit subsumes new methods of organizing businesses under the term 'process innovation' [2003, p.206]. A breakthrough process innovation would then be a process innovation that brings about a significant change in an existing market.

achieve than breakthrough innovation based on assumed needs [Brockhoff, 1988, p. 106-107]. "Consumers may know what their needs are, but they often define those needs in terms of existing products", states Hayes and Abernathy [1980, p. 71]. Gruner and Homburg found that customer involvement in the more concrete concept development stage yields higher performance than in the abstract idea generation stage [2000, p. 10].

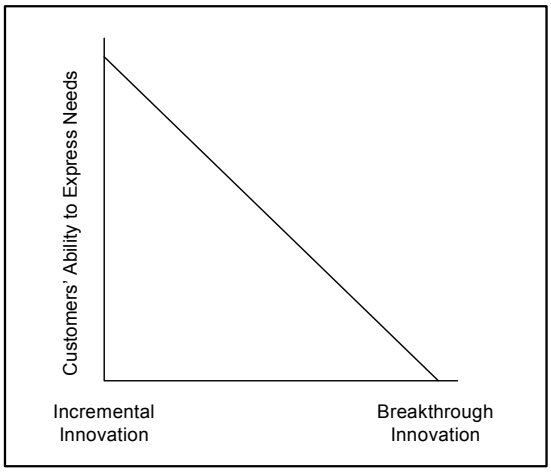

Figure 24. Trade-Off Relationship Between Customers' Abilities and Innovativeness[39]

These and other thoughts suggest that it can be useful to assume that a basic trade-off relationship exists between customer involvement and the innovativeness of a customer-oriented business unit. This trade-off relationship is depicted in figure 24. Customers can relatively easy express needs that lead to an incremental innovation when facing a concrete concept or a product they already used for some time, but they have limited abilities to express needs that would require a breakthrough innovation to be satisfied [e.g. Duke, 1994, p. 50]. For example, after the telephone was invented, first thought as a means to distribute music to households, society decided that this would be a good means to communicate, but before the invention, individuals rarely had been able to state that it was a telephone what they wanted. Customers therefore are a good source of innovation when the objective is incremental innovation. As product management predominantly deals with existing products or product lines,

[39] This figure arose from a discussion with Claus Varnes, Copenhagen Business School (CBS). It was said to have its origin in a students' seminar paper; the original source is unknown. Compare also to [Duke, 1994, p. 50].

breakthrough innovation can even be seen as a threat that would bring turbulence to an established daily business. With some simplification, it can also be said that the objective of product management is incremental innovation, and daily business.

The software industry is a good example. Incremental improvements are here often achieved through open innovation and customer integration. Frequent minor version updates, bug fixes and incremental stylistic innovation tell the story. Major updates sometimes even come together with breakthrough innovation in the form of new concepts, functionality or technology. When Microsoft abandoned the old MS-DOS core in Windows 98 and switched to the more advanced Windows NT technology in Windows 2000, this was a well-timed breakthrough innovation at the start of the new millennium that significantly improved overall stability of the operating system, at the expense of reduced downwards compatibility. These rather seldom breakthrough innovations are most often invented by the software companies themselves. Because software evolves in minor and major steps, a version or lifecycle management is extremely important in this industry, too. Different customers use different versions, and at some point in time, older versions have to be retired even though they still may be in use by some customers. This is one reason why retirement strategies for outdates products are very important for software products, as important as revitalization strategies are for other information products (see also chapter 10).

The final paragraph in this chapter is dedicated to Theodore Levitt's words. In his excellent article *Creativity is not enough*, Levitt wrote:

> "The fact that you can put a dozen inexperienced people into a room and conduct a brainstorming session that produces exciting new ideas shows how little relative importance ideas themselves actually have. Almost anybody with the intelligence of the average businessman can produce them, given a halfway decent environment and stimulus. The scarce people are those who have the know-how, energy, daring, and staying power to implement ideas. […] Ideas do not implement themselves – neither in business, nor in art, science, philosophy, politics, love, war. People implement ideas."[40]

Getting great ideas from whatever source is only one side. On the other side, implementing innovation is the big thing. Ideation and innovation are two distinct things. Customers can always come up with breakthrough ideas, because they are not

[40] [Levitt, 2002, p. 138]

responsible for implementing them. Great breakthrough ideas that are feasible are an important part of every vision; great ideas that are not feasible are just worthless. However, timing is also important and has to be considered, because great ideas may not be feasible now, but they may become feasible in future.

9.3 Innovate First, Then Adapt, Then Innovate…

Product management is a subordinated organizational unit of the business unit. In other words, product management is an operational part of a business unit. In the following, it will be focused on business strategy. Business strategy certainly can, but does not need to influence operational strategy in every case (compare to figure 23). There is a degree of dependence between different organizational units, and between different strategic levels, but there is also a degree of independence. As a rule of thumb, independent and homogenous organizational units are most often better than interdependent and inhomogeneous units, for the sake of manageability. Interdependent and inhomogeneous units, or modules, can easily be decomposed, until the resulting parts are independent and homogenous. This is the powerful basic principle of decomposition.

Besides structure, every system shows a behavior that is always time-dependent [e.g. Ferstl and Sinz, 1998, pp. 11-19]. Structure and behavior are the basic characteristics of every system. With strategy, it is the same; a strategy can be decomposed in regard to structure, and it can be decomposed in regard to time. For example, the approach to decompose a strategy into strategies on different organizational levels, or into several tactical and operational plans is a structural (hierarchical) decomposition. Figure 23 shows both, it shows decomposition in regard to time – from innovation to customer orientation, from youth to maturity – and it shows a structural decomposition with the example of two operational subunits, namely product development and product management, whereas each subunit can pursue a different strategy. Over and above that, the example company (figure 21) possesses not only one but three independent business units that can be at very different developmental stages, further extending the possible strategic variability in regard to structure and time.

The idea of decomposition in regard to time resembles a sequential hybrid strategy proposed by Kleinaltenkamp [1987] called outpacing strategy, a strategy of

timely shift between strategic alternatives while maintaining the already achieved competitive advantage. It has to be stressed that while speed may be important to some extent, a clear direction and vision is even more important. Because every company show a certain extent of inertia, planned strategic change should not be mixed up with dynamics. Dynamic strategies can only destroy stability for the company itself, but not for competitors. Pursuing a strategy rather means to go steadily in one direction once being on the right track, while carefully monitoring environmental changes and continuously reviewing the decisions that have been made. Making quick turns in short time intervals is no strategy, but belongs to the tactical and operational level, and in successful companies, there is usually plenty of dynamics on these levels so that it is not needed on the strategy level. Hence, outpacing on the business strategy level always is outpacing in the long run.

From Business Strategy to Tactics

Rather short-term activities belong to the tactical and operational levels, on the way down toward implementation of a strategy. Tactics and operations can be more dynamic than strategies should ever be. The problem with tactics and operational plans in a thesis like this is that few general recommendations can be given on these increasingly concrete levels without knowledge about the specific external environment and internal conditions of a company. Therefore, the concept of tactical plan templates is introduced here. In the strategic planning cycle, tactical plan templates can be inserted after strategy definition and before elaborating specific tactical and operational implementation plans.

A business unit that for specific reasons has decided to pursue either an innovation-oriented or customer-oriented strategy needs to think about tactical plans next, in order to implement the strategy. To support this task, a generic framework will be presented in the following that can be used in the ideation process to identify areas for innovation, incremental change or expansion. Again, this framework should not be regarded as cookery book recipe, but only as one possibly helpful tool.

Innovation, either breakthrough or at least incremental innovation, is an important ingredient of every strategy. Concerning innovation, Ansoff wrote in 1965:

> "The successful firm of the future will be one which is structured so that both external and internal problems are given appropriate and *continuous* attention. Beyond this, the management structure will be *conducive to innovation*. The search

> for opportunities and problems will be institutionalized and continuous, the internal productive cycle will be R & D oriented, and manufacturing and marketing will be flexible and responsive to changes in product-market mix. Organizational forms and compensation systems will be developed which encourage and reward innovative behavior. Planning will be institutionalized, and the accounting, information, and control system will be oriented towards future prospects, rather than past results."[41]

Baker and Hart as an example for many others see innovation as the development of new products and processes [1999, p. 12]. To make these terms more concrete against the background of this thesis, it is proposed to see process innovation mainly in relation to the supply chain concept, and product innovation in relation to the product lifecycle concept (compare to figure 8).

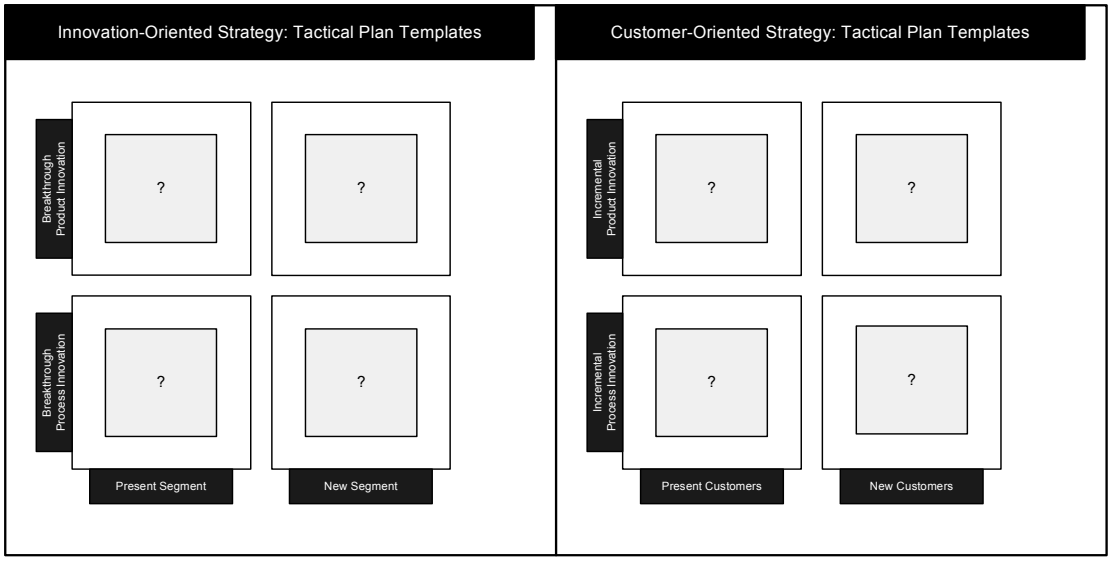

Figure 25. A Generic Framework for the Definition of Tactical Plans

A second ingredient of a successful strategy is market orientation to a certain extent. In a market perspective, there are market segments, and there are individual customers, and there are either current or new segments/customers a company can target. Combining the preceding thought, the two dimensions for the framework proposed and depicted in figure 25 are breakthrough/incremental process and product innovation, and new or current segments/customers, depending on the currently pursued strategic mode.

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[41] [Ansoff, 1965, p. 176]

Notice that contrary to the selection of a strategy, no selection is needed on the tactical level; every strategy can encompass several focused tactical plans. Companies can manage the supply chain and the product lifecycles simultaneously, and it was already noted in earlier chapters that a company could even benefit from doing so. Hence, the more fields in the framework are covered by concrete tactics, the more complete the overall plan will be.

An Example: Planning the Implementation of a Customer-Oriented Strategy

In the following, the framework will be tested by trying to find suitable methods that can fill the fields identified in the framework. Applying the theory of the punctuated equilibrium, a customer-oriented or adaption strategy can be regarded as the equilibrium, while innovation orientation is the punctuation that initializes the development.

For example, the widespread adoption of the Internet as a failsafe distributed system was only made possible because it is based on various, often simple and modular breakthrough ideas, concepts, paradigms and technologies like the client/server paradigm, markup languages like HTML and – recently – XML. The Internet is based on many breakthrough technologies. However, the visionaries that created the foundations of the Internet could not consider possible future abuse of a widespread public infrastructure. Fighting the increasing amount of spam (unsolicited emails) on the Internet therefore today is a typical adaption problem. Making the Internet spam-free is – in an economic view – adaption of the existing technology to the needs of the late adopters, simply ‘making’ the Internet definitely was a breakthrough innovation. Both tasks, adaption and breakthrough innovation, have different basic challenges; the most important for innovation may be getting the right visions and ideas, whereas adaption usually faces complexity of existing systems in various forms of appearance.

Modularity is also an enabler for mass customization and eases customer integration in general. From the point of view of a single company or business unit, modularization of integrated information products is a breakthrough product innovation, because it can create new markets for unbundled or rebundled product modules. Furthermore, modularization is not always as easy as for some media products like music CDs. Complex information products like software may require a completely new architecture when splitting up an integrated whole into independent

modules. For complex information products, the solution space for appropriate modularization can be virtually unlimited.

Digitalization of information products has already been practically proved to be useful. One of the advantages of digital products is that they can be digitally distributed. Again, from the perspective of a single company or business unit, digital distribution is a breakthrough innovation, as it can open up a completely new distribution channels with unmatched efficiency and hence create new (digital) markets. Digitalization and modularization of both information products and processes can be regarded as being complementary to some extent.

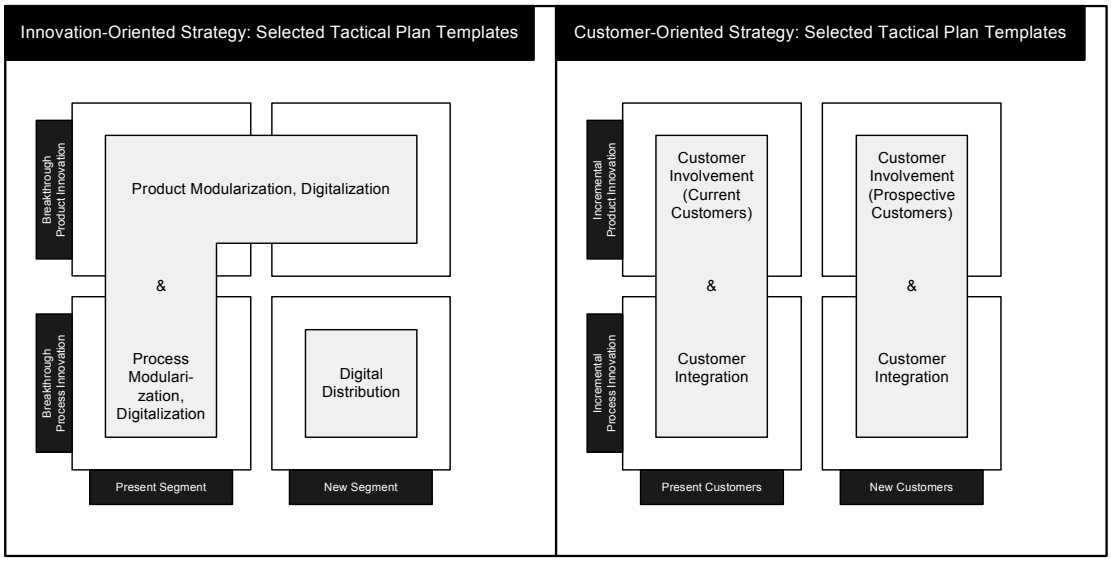

Figure 26. Tactics for a Customer-Oriented Strategy

The primary objective of an innovation-oriented strategy is to achieve as much breakthrough innovation as possible in short time. One of many possible tactics in order to do so is the radical modularization and digitalization of products and processes to build a modern and flexible infrastructure that will be the base for later adaption. A first and concrete outcome of an innovation-oriented strategy can be the ability to distribute digital products digital over digital networks (see figure 26), products that can be split into pieces or modules, distributed separately and unbundled or rebundled to serve a larger market than before. This change is currently taking place in the music industry[42], and with increasing broadband diffusion, it will also

[42] Other information companies again, like providers of Internet services or some software companies, may already be ahead and currently in a period of customer orientation. The strategy proposed here is

reach other sectors of the information industry like the movie industry [compare to Cook and Wang, 2004]. Cook and Wang propose the radical reorganization of central supply chain processes in the movie industry –namely production, distribution and exhibition – and the use of both speed and technology to create diversity in quality and quantity, striving for an economic solution instead of legislative or solely technological approaches like copy protection. Making digital downloads easier and cheaper than pirating can lead to a win-win situation and neutralize the piracy threat, they argue.

In the strategy proposed here, customer orientation follows breakthrough innovation in temporal order. Breakthrough innovation like digital distribution of modular products is not the end; it is the beginning. It is the foundation of a customer-oriented strategy targeted at late adopters. A customer-oriented strategy can be implemented by applying the two methods of customer integration in the supply chain, and customer involvement in the product lifecycle. In addition to or as a replacement of customer involvement, other methods of open innovation can be considered as parts of the tactical plan.

Customer involvement and customer integration are complementary methods. Customer integration is a method to satisfy objective or subjective needs; customer involvement is a method to find out about these needs. When a company only satisfies individual customers' needs it thinks customer might have, it may in fact miss large parts of the potential of a true customer-oriented strategy.

Customer integration and customer involvement work for current customers, but even more interesting is the involvement (and hopefully later integration) of prospective customers. For a company, it is not only interesting to find out about the needs of its current customers, but it would be even more interesting to find out why prospective customers don't buy a product. What is missing, why do they prefer competitive products, where are the problems? Non-customers are an even more promising source of information than customers that already bought products, because

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actually modeled on them, and some of the few successful and nowadays established Internet start-ups naturally are on the leading edge of digital distribution; some software companies even took part in building the Internet. Other software companies like SAP or Oracle are specialized in selling customer-specific modular and digital processes, and software companies have learned how important modular software is in order not only to be, but also to remain competitive.

they are a source for information that will turn non-customers into customers. Hence, finding out about non-customers or prospective customers' subjective and objective needs can reveal starting points for further incremental product innovation.

A variation of the proposed customer-oriented strategy and belonging tactics is described in the title of "Frank Piller's Web Site on Mass Customization, Customer Integration & Open Innovation"[43], the website of the author of a decorated book about mass customization [Piller, 2003]. Mass customization is one of the most prominent types of customer integration in the supply chain, whereas customer involvement is a type of open innovation.

What If? Thinking About the Next Punctuation in the Equilibrium

One thing is clear: customer orientation will not be the end of breakthrough innovation. The next breakthrough innovation will come, either from the inside or the outside of a company. This is one of the reasons why open innovation is so important for a customer-oriented strategy; it is vulnerable against breakthrough innovation that can render existing customer-oriented systems obsolete. Breakthrough innovation however cannot be predicted in advance; it can only be identified as a breakthrough innovation a posteriori, after the event. Who did know that the telephone would become what it is today? No one could have predicted this shortly after the invention. A few might have guessed it, some might have believed it, but no one could have known for sure.

Parallel to their customer-oriented and profitable business units, diversified companies have the possibility to operate innovation-oriented business units, in order to come up with the next breakthrough innovation. They can for example try the 'trial and error' approach popular in practice and continuously bring new innovative products to the market. Most of them might fail, but some may prevail. In the above quotation, Ansoff puts it into words that "the internal productive cycle will be R & D oriented" [1965, p. 176]. What is proposed here for breakthrough product innovation is a closed innovation approach, assisted by customer involvement in the form of carefully selected pilot customers. These pilot customers may be lead users, called technology enthusiasts in figure 22; they may be ahead of the current market and can give valuable input to the development process of completely new products (see

[43] http://www.mass-customization.de

figure 27). In the search for new breakthrough ideas, open innovation may be a helpful tool when carefully applied, and finally, both open or closed process innovation may complete the matrix depicted in figure 27. A breakthrough process in this context may be a method to identify lead users at low cost, probably with the help of the Internet or for example innovation competitions among students or pupils, or in general improved research methods that can foster breakthrough (product) innovation.

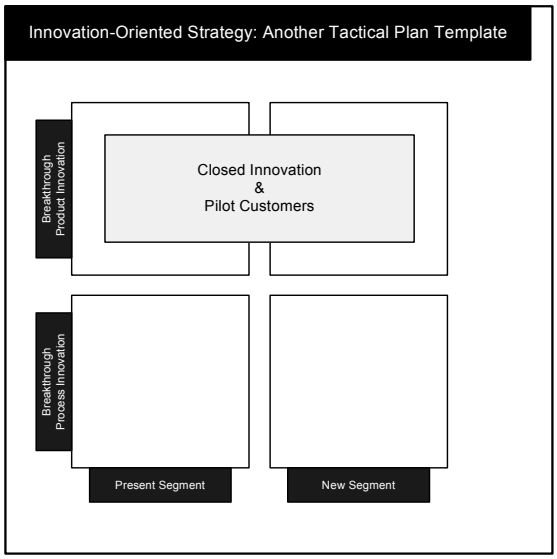

Figure 27. Starting the Next Growth Cycle

To put the basic orientation modes of a business unit in a military context at the end of this chapter, a few helpful associations, which can but do not need to characterize the two orientation modes, are proposed. In this perspective, innovation orientation can be regarded as an offensive strategy. With the deployment of a small task force of highly skilled employees, an attack aimed at the weakest point of the enemy's strategic defense is launched to stir up a whole market. The software industry has seen many of these quick attacks. Reconnaissance missions are conducted with the objective of discovering valuable breakthrough information on hostile terrain. Missions often require extraordinary skills and are sometimes of high risk. Customer orientation on the other side is a defensive strategy; mass counts, and the main defenses forces – powerful but slow – are put into action. Customers are bound to a company by lock-in, an additional shield against competition. To conclude, the battles of innovation and adaption are often started in an anonymous marketplace, but they are finally won only with the continuous support of every single customer.

10 Product Revitalization

When sales of specific products decline, product managers on the operational level of a business unit have two basic options: they can retire the product pursuing a retirement strategy, or they can try to revitalize the product, pursuing a revitalization strategy. This chapter outlines these basic options on the product strategy level. “Product obsolescence is inescapable” [Meyer and Utterback, 1993, p. 45]. Existing information products need to be improved continuously. Nevertheless, product managers may face declining product sales several times in the lifecycle of a product.

Indeed, information products have a lifecycle. They decay with their carrier medium, they decay as technology advances and standards and customer expectations rise. They go out of fashion, they are replaced by new improved versions, they become obsolete like the news of yesterday, the music of last year. But still, the music of 200 years ago is nowadays called ‘classical music’, and is still purchased.

Baker and Hart note that “every (declining) industry was once a growth industry” [1999, p. 419]. Anke Brack, as a representative of many other authors, states that the media industry for example is in the later stages of its lifecycle with relative low potential for further cost savings [2003, p. 66]. Not only products have a lifecycle, but also industries (compare to figure 14). Human beings have a lifecycle. In the previous chapter, it has been shown that business units can have a lifecycle, too. Markets have a lifecycle. These statements indicate that cyclic developments are observable in many economic areas. One can conclude that revitalization and retirement are important to many areas of economy, in macroeconomics as well as in microeconomics, and especially at the later or declining stages. Decline sometimes is inevitable; sometimes it can be reverted or at least delayed with some efforts.

10.1 A Reoccurring Decision

Decisions about revitalization or retirement of products often become imminent when these products have exceeded the peak of maturity. But also during the growth stage, corrective measures in answer to internal or external problems, like for example readjustments of the marketing-mix, may be needed to ensure a steady growth of product sales. This chapter is for the most parts based on Baker and Hart's impressing, both scientific and practical book *Product Strategy and Management* [1999], chapter 17-19 about product retirement and revitalization.

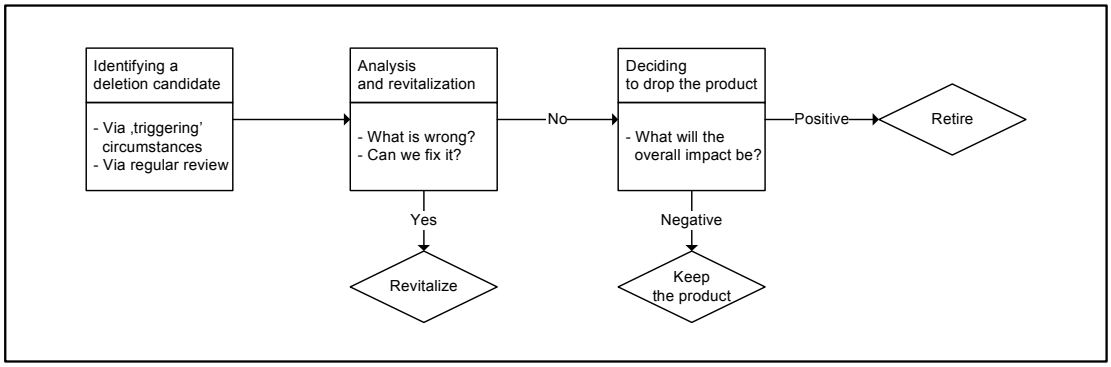

Figure 28. The Product Deletion Decision [simplified from Baker and Hart, 1999, p. 428]

Baker and Hart propose a two-step model for the product retirement decision depicted in figure 28. The decision process starts with the detection of a deletion candidate. Weak products can be identified by reviewing products' performance in regard to minimum standards regularly, and by defining triggers that fire when an exceptional condition occurs. Baker and Hart enumerate 16 relevant triggers grouped into four categories that can start a product retirement decision. The four categories are Poor performance (market, sales, profit, quality), Strategic triggers (resource conflicts, variety reduction, poor fit with strategy, rationalization due to mergers & acquisitions, poor fit with company image, parent company policy, development of a replacement product), Operational triggers (sourcing problems, operational problems) and External triggers (competitive activity, third-party decisions, government policies & regulations). Harness, Marr and Goy [1998] add societal changes as an additional external trigger. Especially for information products, technological change is another important external trigger.

After a thorough analysis of the causes that made one or more triggers fire, product management may come to the conclusion that a product can be revitalized instead of being deleted, prolonging its lifecycle or even starting a new growth cycle. Even if product revitalization does not seem to be feasible or fails, it is sometimes reasonable to keep a product when the overall impact of deletion on the rest of the business unit's operations will be negative. Revitalization and product line scope are "Rational reasons for neglecting product deletion" [Baker and Hart, 1999, p. 423].

For example, a product may be needed in the product line as a complementary product to complete the portfolio, like a piece of software that would otherwise render a certain software package incomplete. Customer patronage, especially in B2B relationships, may be another reason for not deleting a weak product, for example when customers are used to buy several information products from a single source. This may be a decision parameter in B2B relationships between information companies and information producers. Hence, the effect of product retirement on customer relations is one of many other effects that have to be considered before finally abandoning a product. Product retirement as a strategy should be a planned decision based on a controlling system like the one proposed by Baker and Hart so that it will not be a hasty decision in reaction to a pressing crisis [see also Brockhoff, 1988, p. 247].

Revitalization strategies are hold or growth strategies. They can be implemented applying methods of the marketing-mix, for example price decrease, price increase in declining markets, cost reduction, product modifications, quality improvements, advertisement increase, sales promotion increase, distribution improvements or distribution channel change. In this context, Meyer and Utterback criticize the 'coasting mentality' of many companies as a result of portfolio management approaches to new product development [1993, p. 44]. As soon as a product or product line reaches a level of high success, resources are shifted to emerging products and only maintenance-level resources are allocated to these mature products. This can yield many mediocre products rather than many successful products, they say. Instead, reinvestments and revitalization are essential to rapidly changing markets with high levels of technological change.

In contrast to revitalization, product retirement strategies are shrink strategies. Baker and Hart name four relevant retirement strategies: Dropping the products from the standard range and reintroducing as a 'special', Run out (harvest/milk), Phase out

immediately and Drop immediately, with decreasing lead time. In the case of information products, retirement nearly always means archiving the (digital) information, as they are the most valuable assets of information companies and may be reusable at a later date. Media companies for example have accumulated large media archives they could reuse pursuing a customer-oriented strategy based on digital distribution. To conclude, the decision about revitalization or retirement of mature products is as important for a company as the development of new products, and adopting an 'ostrich attitude' is not the way to go. The revitalization of successful products can also be less risky and less costly than the introduction of completely new products.

10.2 Other Revitalization Strategies

Utterback [1994] describes the dynamics of innovation, as it is observable in many industries (see figure 14). In the end, industries reach the mature or specific phase. Utterback calls this phase specific because in this phase, very specific products are assembled at a high level of efficiency.

> "Here, the value ratio of quality to cost becomes the basis of competition. Products in this specific phase become highly defined, and the differences between products of competitors are often fewer than the similarities. […] The linkages between product and process are now extremely close. Any small change in either product or process is likely to be difficult and expensive and require a corresponding change in the other."[44]

Is the specific phase of production the 'end of history' for an industry, Utterback asks [p. 98]. "Is there a way to break out of this highly capitalized, highly controlled, and generally uninnovative mode of production?" [p.98]. For the manufacturing industry, Utterback proposes flexible manufacturing and mass customization as a possible solution. "Flexible manufacturing and the strategy of mass customization seems to offer an escape hatch from the innovative dead end of the specific phase" [Utterback, 1994, p. 99]. For the information industry, this can be translated into modularization of products and processes, and mass customization. Hence, mass customization is a revitalization strategy in mature industries.

[44] [Utterback, 1994, p. 96]

The strategy proposed in this thesis is a revitalization strategy for mature business units in the information industry. From early innovation, enabling a flexible production of information, to later adaption, offering flexible information products that can be adapted to individual customers' objective and subjective needs. Mass customization of mature products is one of many possible ways to implement this strategy, like customer integration and customer involvement in general. The strategy can initiate a shift from mass production to mass customization, and this specific shift is not straight ahead, but is reached by indirection. The way towards revitalization goes past breakthrough process innovation and breakthrough product innovation.

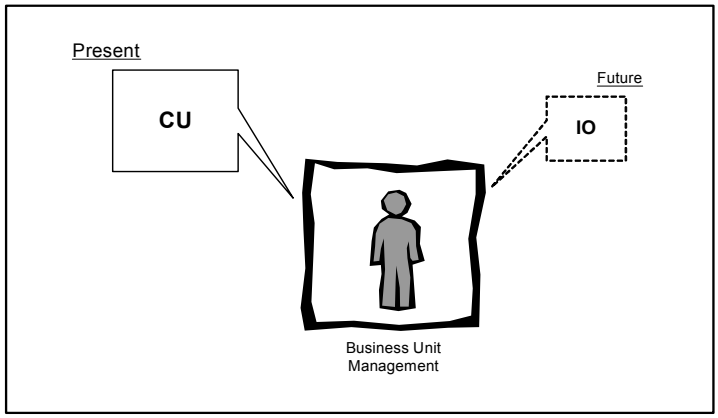

Figure 29. Strategy Shift Requires a Sense of Timing

The strategy proposed in this thesis is not a strategy that inevitably leads towards mass customization. It is rather a strategy that integrates the individual customer in the supply chain, and a strategy that involves the individual customer in the innovation process. It is a strategy that moves a business unit from a technology-centered youth to a customer-oriented maturity, and vice versa from a customer-oriented maturity to a technology-centered growth stage, in never-ending cycles, from growth to maturity, and from maturity to growth. It is a continuous hold or growth strategy that constantly monitors its competitive environment, its markets and customers. It is a strategy of strategic shifts that requires a sure instinct of timing (see figure 29). It is a strategy oriented towards the customer, a customer-oriented strategy aiming at the vision of customer orientation with small market segments, up to segments of one. And at the right time, this strategy is punctuated by a strategy towards innovation, aiming at the vision of breakthrough innovation.

11 Conclusion

In this thesis, a sequential business strategy has been proposed that is based on early innovation and later adaption. Information companies can implement this strategy in consideration of the tactical plan templates that have been proposed here as guidelines. This strategy can be applied as a revitalization strategy for mature business units or products, provided that young innovative products and mature products are grouped in different business units to achieve economies of scope and first of all, to be able to pursue a clear (unambiguous) common business strategy per unit. Findings suggest that the concept of hybrid strategies needs some rethinking. Until then, the well-accepted works of Porter and Ansoff can give guidelines for corporate and business unit strategies, whereas the approach of Berthon, Hulbert and Pitt seems to be useful to throw light on the nature of hybrid strategies. Simultaneous hybrid strategies should be avoided. Instead, categorizing strategic objectives into primary and secondary objectives is recommended.

Not all methods discussed in this thesis may be suitable for specific information industry sectors. Parts of the strategy however are generically applicable and are relevant to every industry where information products play a significant role. Modularity and customer integration for example have vast fields of application. However, for a strategy that can be called customer-oriented, customer involvement or similar methods of open innovation need to be considered.

How to Make a Simultaneous Hybrid Strategy Out of a Sequential Strategy

In this thesis, a sequential (hybrid) business strategy has been proposed. In this thesis, a simultaneous hybrid business strategy has been proposed. A paradox? Far from it! The key to resolve this contradiction is decomposition. This time, a real cookery book recipe will be presented that stems from system theory.

In figure 23, a sequential hybrid strategy was modeled and formally noted, capturing both relevant structure and relevant behavior of a real sociotechnological system. Three simple steps are needed to make a simultaneous hybrid strategy out of this sequential strategy:

- Observe an existing sociotechnological system and abstract it to capture the most relevant structural and temporal details in a model of a sequential strategy in order to solve a given problem (figure 23).
- Disregard time/behavior; create a snapshot of the time-dependent model (figure 30, left side)
- Disregard structure, take an outside-in, black-box or top-down perspective to hide implementation details (figure 30, right side)

The result is a static abstraction of a time-dependent model, a static abstraction of an abstraction, or an abstraction of an abstraction of an abstraction. With each transformation step, information gets lost. The highest information loss occurs when the real system is transformed into a model, as large parts of the real system are disregarded in the model. With each further step of abstraction, further information is removed from the model, finally ending up in a model of a simultaneous hybrid strategy, the most abstract form of a strategy based on trade-offs.

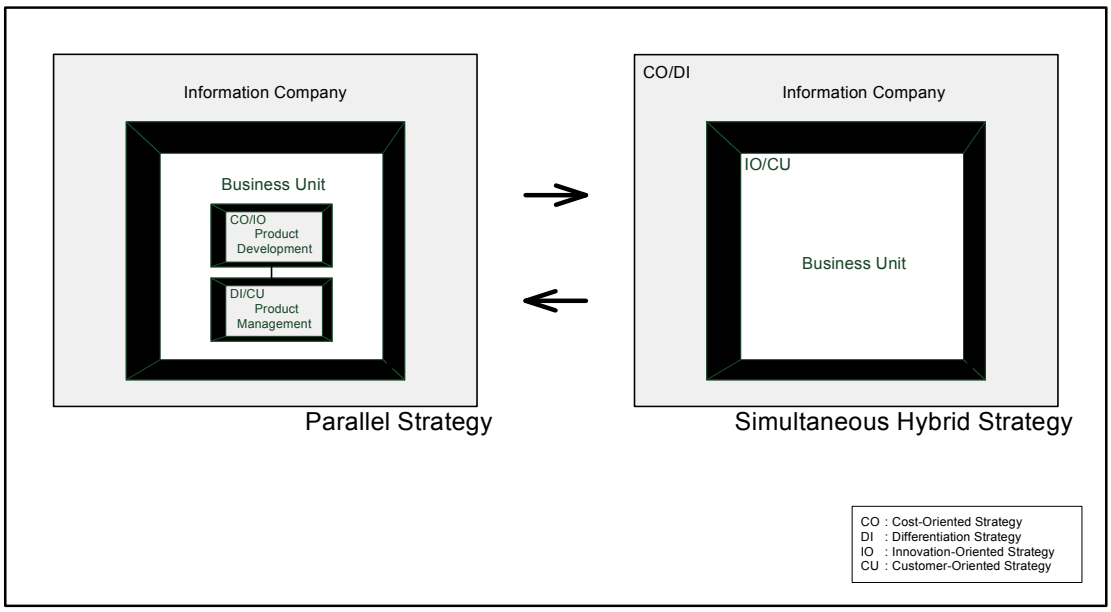

Figure 30. Bottom-Up Implementation (left) vs. Top-Down Observation (right)

If this finding can be generalized, what seems to be reasonable, this would mean that purely simultaneous hybrid strategies and purely sequential hybrid strategies are two extreme points in a continuum of strategy modeling. This may be proved by the application of system theory, the origin of all formal models. Sequential and parallel strategies can be compressed, whereas information loss occurs, and reversely, simultaneous hybrid strategies can be sequentialized or parallelized. However, while the compression of a sequential or parallel strategy is a straightforward task, expansion of a simultaneous hybrid strategy is no such easy task, as the lost information has to be reconstructed before the strategy is implemented. Taking for example figure 30 (right side), assuming someone has not read this thesis and don't know anything about the sequential strategy proposed in this thesis, how likely is it that he/she will be able to decompose the simultaneous hybrid strategy to come up with the model depicted in figure 23? The simultaneous hybrid strategy depicted in figure 30 (right side) can be called the 'father of all hybrid strategies', but is an abstract father that can have an uncountable amount of children derived only through decomposition. There are infinite possibilities to decompose a simultaneous hybrid strategy, as it can be decomposed again and again, and in that sense, a model of a simultaneous hybrid strategy contains no information about how it is implemented. In that point of view, figure 23 is of much more value than the compressed simultaneous hybrid strategy, because it contains information about the when and the where of the strategy to be implemented, which on the other hand limits its general applicability. This, by the way, is a general trade-off of formal models: the more concrete they are, the less general is their applicability. On the other hand, the more abstract they are, the less is their practical use.

The preceding thoughts can also explain why simultaneous hybrid strategies should be avoided when implementing a strategy. They should be avoided because it is rational and simple to do so. To avoid simultaneous hybridism, system theory provides two possibilities: a simultaneous hybrid strategy can be decomposed in regard to structure, and it can be decomposed in regard to time. In regard to time, the contradicting objectives can be pursued in temporal order at the same place, and in regard to structure, contradicting objectives can be pursued at the same time at different places. Different places do not imperatively need to be different business units, the competing objectives can also be assigned to different operational subunits within one single business units, as business units are modular systems in the inside.

Various human and mechanical agents for example are parts of a business unit. Each functional subunit and even each human being in a business unit can be an independent subsystem that can and most often does pursue its own strategy. If a simultaneous hybrid strategy is not decomposed, it can be decomposed the latest in the head of decision makers who know that hybrid decisions without priorities often are a waste of resources and therefore the potential precursor of mediocrity.

Surely, simultaneous hybrid strategies are feasible, as well as mediocrity cannot be forbidden. But the important question is: why should ambiguous, simultaneous hybrid strategies without a clear vision be preferred to clear sequential strategies? In literature, no answer could be found to this question. Simultaneous hybrid strategies often are explained with the increasing use of ICT. However ICT has not only advantages, it has also disadvantages that only become clear when the operational level is also considered. Remember, the highly flexible and new software system of yesterday is the legacy system of tomorrow. ICT itself underlies various trade-offs, as for example the project triangle between time, quality and costs shows. It seems more than questionable that a technology that itself underlies trade-offs can make classical trade-offs like the one between costs and differentiation completely disappear. Isn't it more likely that these trade-offs are simply moved from one location to another with the use of ICT? Technology may change the level of impact trade-offs show, but can technology alone abrogate fundamental laws that are omnipresent in real systems, above all because costs/differentiation and innovation/adaption are by far not the only trade-offs that exist?

The theory of trade-offs, most scientists agreed with Porter only two decades ago, is clearly against simultaneous hybrid strategies. Modularity is often a good way to decompose complex problems. Findings suggest that simultaneous hybrid strategies can be decomposed. So why not do it?

Hypothesis 2 (Customer Involvement)

First of all, it has to be distinguished between incremental and breakthrough innovation. Customer integration can foster incremental innovation, and in rare cases, for example when lead users are involved, it can also foster breakthrough innovation. Therefore, hypothesis 2 can be partly supported. When the objective is incremental innovation, customer involvement is a method to find out about customers' subjective and objective needs. Customers should be involved in product development and

product management where incremental innovation is useful to improve the quality of existing products. Customer-oriented business units in general can use the approach of open innovation in order not to miss the (breakthrough) innovations of competitors and suppliers. As both radical and incremental innovation is supported by this combined approach of customer involvement and open innovation, the company's overall competitiveness is raised.

Findings also suggest that the integration of customers at different stages in the product lifecycle yields different performance. Specific studies for the information industry are not available, but based on Gruner and Homburg's study it can be concluded that more concrete stages yield better performance. This finds some common ground with the assumption that customer involvement mainly yields incremental innovation when dealing with existing products, whereas customers are worse at expressing their needs when it comes to breakthrough innovation and completely new products. Finally, both breakthrough and incremental innovation need to be implementable. Getting ideas from customers is one thing; implementing innovation is another thing. People still induce innovation, and people implement innovation.

Hypothesis 1 (Customer Orientation)

Besides the strategy of customer orientation, there is at least another strategic option of innovation orientation. Even though the theory of the punctuated equilibrium indicates that strategies with a low innovation orientation (mediocre strategies and customer-oriented strategies in figure 16) are the predominant strategic orientation modes of a business unit, this theory also indicates that innovation orientation is equally important for the long-term development of a business unit. Second, following Porter, strategy is a unique and valuable position, and there is no single position that fits all business units. (Breakthrough) innovation hence is as important as adaption.

An optimal fit between internal capabilities and external environment is the goal of every successful strategy. Under normal environmental conditions, a customer-oriented strategy may suit best for business units selling or renting digital information products; in times of stress however, an innovation-oriented strategy may be better. But this view regards punctuations as threats; planned punctuations may also be an opportunity for a business unit to reach a better position. Some business units may even be successful with strategies called mediocre or ambiguous here. To

conclude, there is no single strategy that fits all possible circumstances. Therefore, hypothesis 1 has to be rejected.

The existence of hybrid strategies further complicates the case. The four strategic options for a competition-oriented business unit proposed here seem to be a good starting point when defining business strategies. A diversified company can have different business units with any of the four possible combinations, and this can even be recommended, as a balanced portfolio of business units with any of the four possible strategic orientations means sustainability. From an outside-in perspective, it then appears as if a company pursues a hybrid corporate strategy, but inside, different strategies are clearly assigned to different business units. And even inside of one single business unit, companies can pursue different strategies in different subunits, as it was shown before with the example of product development and product management. This may again appear like a simultaneous hybrid business strategy from the outside, but inside, different strategies are clearly assigned to different operational subunits. Simultaneous hybrid strategies therefore can be ambiguous strategies, but they do not need to be. Only when the ambiguity is not appropriately handled through decomposition, a simultaneous hybrid strategy becomes an ambiguous strategy, and decomposition in regard to time, or decomposition in regard to structure are appropriate ways to address ambiguity (see figure 31).

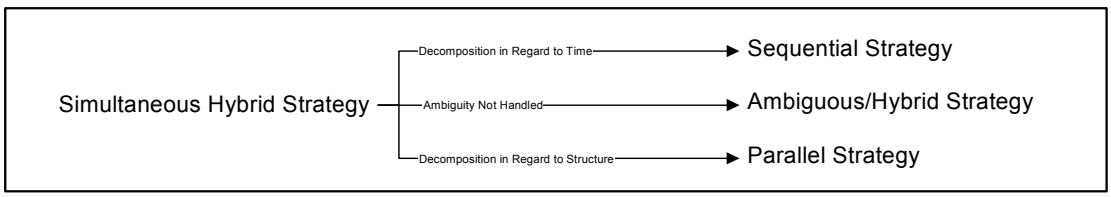

Figure 31. Implementing a Simultaneous Hybrid Strategy

Just to clarify things, figure 32 depicts how ambiguous/hybrid strategies (compare to figure 11 and 16) should be implemented.

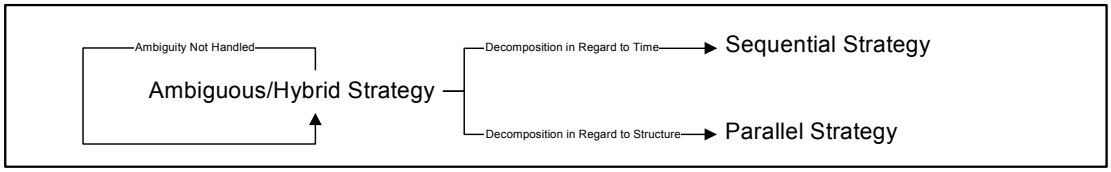

Figure 32. Implementing an Ambiguous/Hybrid Strategy

Research Question

There is no single strategy that can ensure everlasting competitiveness and continuous success. Continued success, expansion and growth cannot be guaranteed [e.g. Baker and Hart, 1999, p. 419]. Every company, every business unit and every operational unit must find its own strategy, and science can only give general hints. One hint is not to ignore trade-offs. Trade-offs are omnipresent in real systems, and a strategy that is implementable must address these trade-offs.

An important lesson from the lifecycle concept is that time has to be considered when thinking about strategy. Change, both internal and external change is an important determinant of strategy. The sequential strategy proposed in this thesis suggests that the strategy shifts are more important than the strategies themselves. The problem with strategy shifts however is that a good sense of timing is needed. Business unit management therefore needs a good monitoring system, besides the ability to make clear decisions. Decisions should not be made after a crisis occurs, but before.

An important lesson from system theory is that companies can be regarded as sociotechnological systems. They have a structure, and they have a behavior, and they can be modeled. Strategy needs to fit to the system structure. In other words, strategies will diffuse in the system. They will mainly diffuse in the social part of the sociotechnological system; they will be communicated among the people. This is important because people implement the strategies. Strategies don't implement themselves. Strategies are activities, implemented through tactical and operational plans. Strategies can also influence the system structure, e.g. when a new business unit is created to foster breakthrough innovation. Strategy influences the system behavior. Therefore, companies are targeted sociotechnological systems. Strategies define the targets for the system, or for its subsystems. Visions are the targets of strategies.

An important lesson from Berthon, Hulbert and Pitt's strategy matrix is the importance of priorities to strategies that are based on trade-offs. Trade-offs can be addressed by introducing priorities, for example high customer orientation as primary objective of a strategy, and low innovation orientation as a secondary objective.

All three theories can be merged together in a guideline for strategy implementation. This will be called the triangle of strategy implementation (figure

33). Which business strategy is right? Innovation orientation or customer orientation, differentiation or cost orientation? One possible answer is: all of them can be right. It depends on the circumstances. The strategy triangle is introduced only to visualize one simple constraint: when implementing more than one strategy: these strategies should not be implemented in the same organizational unit, at the same time, with equal priority. You can only have two equal values out of three. Innovation and adaption, same place and same time, this means introducing different priorities. Cost orientation and differentiation with equal priority at the same time, this means implementing the strategies in different organizational units. Innovation and adaption at the same place and with equal priority, this means different times, i.e. first innovation, then adaption, or vice versa. The triangle hence depicts the three basic options to avoid ambiguity in strategies.

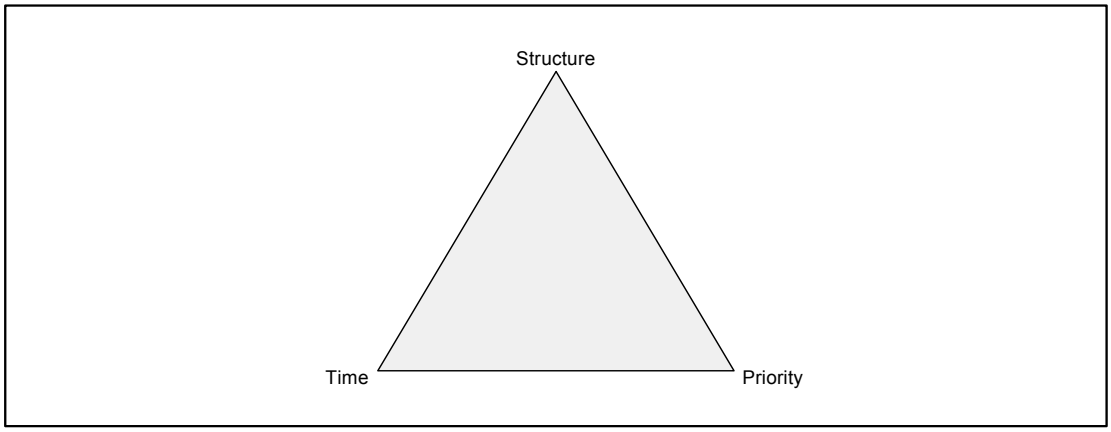

Figure 33. The Triangle of Strategy Implementation

In this thesis, a sequential business strategy has been proposed that is based on early innovation and later adaption. Taking everything into account, how can this strategy be implemented in the social part of a sociotechnological system? A possible answer is given in figure 34, which is basically a model of a control circuit with business unit management as a controller. In this model, business unit management specifies the main direction of either innovation orientation or customer orientation. The two involved operational units, product development and product management can both pursue their own strategy, which may also change over time. In the middle of the figure, the conflicts and inherent trade-offs emerging from the simultaneous pursuit of different strategies in one business unit will be resolved, whereas business strategy represented by business unit management is the most decisive. Case-based

agreements are the outcome, achieved through communication, collaboration, discussion or competition of the different strategic orientations, leading to tactical and operational plans that will then be implemented by the actors involved in the decision-making (and probably, as it is basically an open system, also by other actors not involved in the decision-making and not depicted).

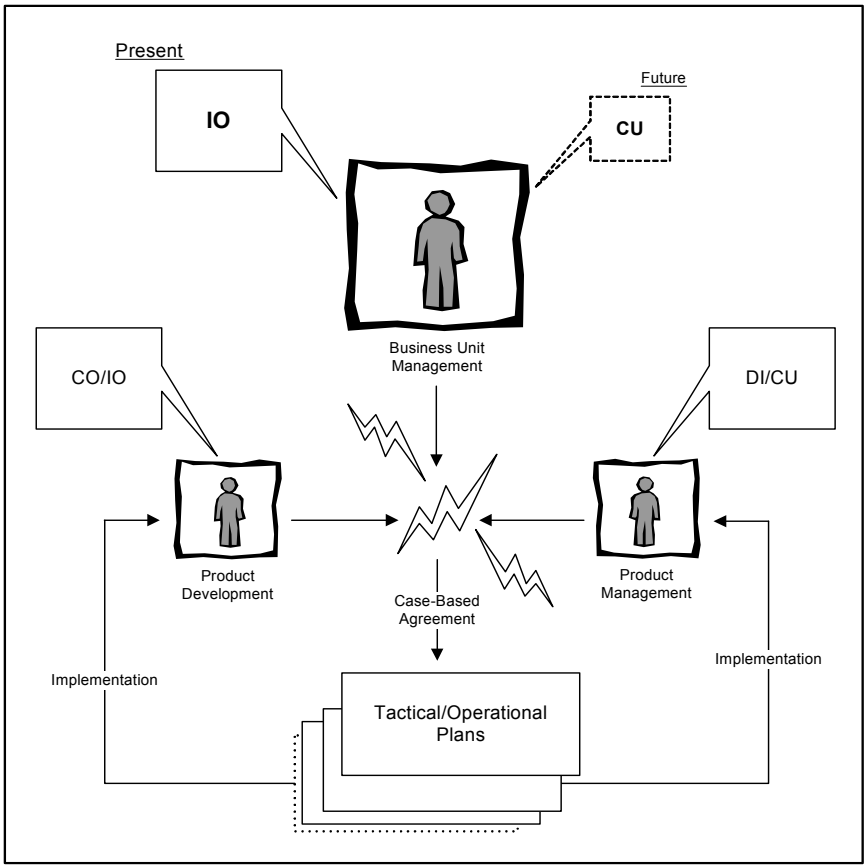

Figure 34. A Sociotechnological System of Independent Actors

Note that in an outside-in perspective, this system would appear as a highly contradicting CO/DI/IO/CU system, but the system only works because is well-structured inside, and there are no ambiguous strategies as each agent pursues a clear sequential strategy. Furthermore, the system is flexible and can combine the advantages of different strategic orientation modes, whereas surely the center of the figure will decide if the system will show a high performance in large, or not.

Figure 34 clearly shows that the combination of contradicting strategic orientations in one business unit is well possible, even without the support of sophisticated ICT. What has to be stressed is that the internal system structure in an important determinant of business unit performance that must not be neglected. The

secrets of success are often hidden deep inside sociotechnological systems, and a most abstract outside-in perspective will not be enough to find out about these secrets. Detailed analyses on the operational level of existing companies are needed in hybrid strategy research. The abstract top-down perspective that only knows corporate strategy and business strategy is not any more sufficient to explain success or failure of hybrid strategies. As a first step, it seems useful to distinguish between simultaneous hybrid strategies, and ambiguous strategies, as it was done in this thesis. Simultaneous hybrid strategies can be but not necessarily are ambiguous. When the ambiguity is appropriately addressed in organizational substructures and processes, hybrid strategies can be one of the most promising approaches to strategy. Decomposition and sequentialization of ambiguous strategies are the key methods to implement hybrid strategies with high performance, strategies that are called sequential and parallel strategies in this thesis.

Hybrid strategies are a phenomenon that is best explored bottom-up. The reason is simple. Hybrid corporate strategy can be explained through different business units pursuing strategies of cost-orientation and differentiation simultaneously, while hybrid business strategy can be explained through operational subunits pursuing different corporate or business strategies simultaneously. Hybrid strategies clearly reveal a tendency towards the lower organizational levels, and the secrets are here believed to be found only on the operational level. Strategy modeling could be a research field opened up by hybrid strategies, identifying strategic patterns like the sequential hybrid strategy discussed in this thesis.

Some final words of warning: the idea that simultaneous hybridism can be implemented without thinking about temporal or structural decomposition of a system is as misleading as dangerous. A simultaneous hybrid strategy is an artificial construct of abstraction that neglects the inner structure of the system and therefore the way of how the strategy is implemented. A simultaneous hybrid strategy without any implementation details is not of much value. A strategy needs to be implementable. “Since business is a uniquely ‘get things done’ institution, creativity without action-oriented follow-through is a unique barren form of individual behavior. Actually, in a sense, it is even irresponsible” [Levitt, 2002, p. 138]. A strategy is responsibility, responsibility for the lower levels of organizational hierarchy. People implement strategies.

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Abstract

Information companies are sociotechnological, targeted and open systems with at least one strategic business unit (SBU) that sells or rents (digital) information products. Operational activities are carried out in business units. Strategies define the broad directions for the system and for its subsystems. Visions are the targets of strategies, and specific, measurable, achievable, result-oriented and time-based (SMART) objectives need to be defined to give systems that possess a degree of inertia a concrete, measurable direction.

In this thesis, both a bottom-up and a top-down approach to strategy will be taken. As an example for a bottom-up approach, a sequential, parallel, customer-oriented business strategy for the management of digital information products, a strategy that can be implemented through customer involvement in the product lifecycle, and through customer integration in the supply chain, will be elaborated. This strategy is best induced by a preceding timely shift towards (radical) product and process innovation, a limited punctuation of a long-term equilibrium of customer orientation and incremental innovation.

Hybrid strategies like the one presented in this thesis are built on modular, independent and homogenous subsystems that communicate, collaborate, compete and finally agree on joint activities, manifested in plans that then are implemented by the actors involved in order to achieve the various primary and secondary objectives on the way towards a greater, common vision.

Simultaneous hybrid strategies are a top-down or abstract view on this whole system. As simultaneous hybrid strategies possess a degree of ambiguity or even impossibility because they hide implementation details of the system, the ambiguity needs to be handled on the operational level when a hybrid strategy is implemented. Ambiguity can be resolved by introducing priorities for strategic objectives, by parallelizing strategy execution in regard to system structure, or by sequentializing strategy execution in regard to time. A top-level strategy first of all is responsibility, responsibility for the lower levels of organizational hierarchy.