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Linking Corporate, Marketing and Manufacturing Strategy:

The Real Implications for Manufacturing Companies

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Abstract: The link between corporate, manufacturing and the marketing strategy is often seen as hierarchical. But existing capabilities can restrict the implementation of new strategies, backfiring higher level concepts. Hierarchical and static models often neglect this interaction. This paper provides a conceptual framework that links marketing, manufacturing and corporate strategy. It furthermore brings together market and resource based view. The conceptual framework has been derived literature based and tested through case study research. The framework not only combines the different perspectives, but can be used as a visualizing tool. Systematically combining a manufacturing and a marketing perspective leads to management implications which even can include the redefinition of the corporate strategy. This article highlights the procedure as well as the results and closes with a discussion of the implications.

Introduction

One of the key tasks of the corporate strategy is to orchestrate the activities of an organization as well as to highlight development opportunities. Manufacturing strategy as well as marketing strategy researchers state, that there has to be a link between corporate and the functional strategies (Berry, Hill, & Klompaker, 1994, 1999; Christiansen, Berry, Bruun, & Ward, 2003; Ward et al., 2000). As every function tries to identify the most important factors concerning their own activities, the links are often neglected during daily operations. Furthermore, marketing managers are often unaware of unique operational capabilities that can differentiate the products from their competitors in particular market segments (Berry, Bozarth, Hill, & Klompaker, 1991).

Market segmentation techniques are a well known topic in the marketing literature. This practice has enabled companies to focus their offers on specific segment needs. While it is the goal of the whole segmentation procedure to derive segments which have to be addressed

with different marketing activities, e.g. price or quality oriented, the implications for the manufacturing department is often neglected.

Companies often are serving different markets out of one manufacturing site. The markets are segmented based on the industry, e.g. automotive, construction or aerospace. Although this segmentation is important for marketing activities and corporate strategies, it isn't as important for the management of the manufacturing. E.g. the automotive and the construction industry can have the same relevant customer requirements as well as very different ones with emphasis on manufacturing, e.g. quality demands in terms of tolerances and surface standards. Therefore segmentation activities relevant for the marketing activities often have a lack of relevance for the manufacturing activities. This is also confirmed by Menda and Dilts (1997) who criticize that: "...order-winners may not always explicitly define key manufacturing tasks nor are such order winners always stated in manufacturing terms."

This paper addresses the role of market differences relevant for the manufacturing department and therefore links marketing aspects and manufacturing strategy. Furthermore the derived segmentation gives implications on how to develop the customer base as well as which manufacturing capabilities are important for the market activities and have to be developed further therefore giving hints for the corporate strategy. Using manufacturing related variables to draw customer segmentation helps to define segments relevant for marketing as well as manufacturing. Starting from a literature review concerning manufacturing strategy, the need for the combination of manufacturing, marketing and corporate strategy is highlighted. The paper stems from a manufacturing strategy perspective due to the fact, that the existing manufacturing strategy studies have been merely reactive in nature resulting in a strong need to further develop these research activities. It isn't the goal of the paper to analyze corporate and marketing strategy research in depth but to show the implications on these strategies resulting from a proactive inclusion of the operational aspects at the beginning of the strategy process. The

introduction section of manufacturing strategy literature will be followed by an analysis which kind of variables are relevant for the manufacturing strategy and therefore have to be included in the market segmentation. With the help of case study research, the procedure will be highlighted, followed by a discussion and further research suggestions.

Literature overview of the manufacturing strategy process

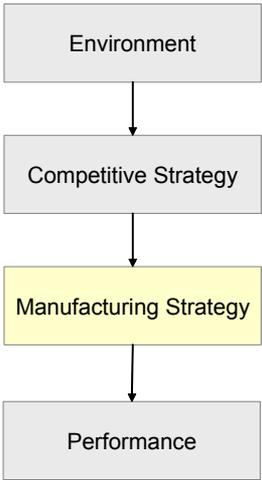


Figure 1: Conceptual model of manufacturing strategy in its context (Ward & Duray, 2000)

The need for linking corporate strategy to functional strategies as marketing or manufacturing is often claimed by researchers. The origin of the conceptual model described in Ward and Duray (2000) can be traced to Skinner (1969), describing in detail the links among environment, competitive strategy and manufacturing strategy to achieve good performance. Empirical validation of the conceptual model (e.g. Platts & Gregory, 1990; Vickery, 1991; Ward et al., 2000) shows that the long standing conceptual argument of linking environment, corporate strategy, manufacturing strategy and performance can be provided empirically in high

performance firms. Companies reporting poor corporate performance on the other hand didn't fit to the conceptual model. Furthermore, Ward et al. (2000) reported that there is no direct link between environmental dynamism and manufacturing strategy. This supports the assumption that corporate strategy has to mediate between environmental dynamism and manufacturing strategy. This is also the case between the relationship of corporate strategy and performance, which is linked by manufacturing strategy. Finally Ward et al. (2000, p.135) state that: "Perhaps most notably, the findings provide empirical evidence that manufacturing and competitive strategies are inextricably linked in high performance firms." Swamidass and Nevell (1987) found in their study out that high-level management emphasised in some cases on quality and technology while manufacturing managers stressed cost and delivery performance

which leads to a lack of congruence and poorer performance. Another case study based example of the misalignment of marketing and manufacturing strategy is demonstrated by Berry et al. (1999).

Because of the interrelationship among the firm's manufacturing and other functions the process of designing a manufacturing strategy must be carried beyond the borders of the firm's manufacturing task (Fine & Hax, 1985). Therefore an analysis of a successful composition of a manufacturing strategy has to include the relations to the environment, the markets as well as other corporate decisions including the corporate strategy. However, the linkage between manufacturing and corporate strategy is often ill-defined (Brown & Blackmon, 2005). There is the need to integrate all perspectives.

The top down approach as stated by Ward et al. (2000) as well as Berry et al. (1999) is very common in manufacturing strategy literature. It implies that manufacturing capabilities have to support the market opportunities identified through the corporate strategy. The manufacturing department therefore is responsible that the way the corporate strategy wants to compete in the market can be accomplished. This leads to pure reactive manufacturing department where the strength aren't used as well as possible (Wheelwright & Hayes, 1985). Furthermore, manufacturing departments are often facing constraints like lack of specific knowledge, too few and inexperienced work staff, wrong type of machines, unchangeable processes, and contradicting goals which often aren't taken into account enough in a pure top down approach.

- Step 1: elicit marketing's view of the market and identify its strategic initiatives.
- Step 2: establish marketing's view of the market and verify if the views on customer needs are correct both in terms of perspective and emphasis.
- Step 3: check manufacturing performance against those customer requirements for which it is solely or partly responsible.
- Step 4: compare current and future manufacturing investments and developments (i.e. manufacturing strategy), with the customer requirements for which it is solely or partly responsible.
- Step 5: identify the investments and developments necessary to resolve differences between customer requirements and manufacturing's performance.

Figure 2: Framework and methodology to align marketing and manufacturing strategies (Berry et al., 1999)

The alignment of the marketing and manufacturing strategy literature is a legendary claim (Berry et al., 1994), and a lot of research has been done deriving a slightly different approach as shown in Figure 2 (see also Dangayach & Deshmukh (2001)). Therefore the alignment of the manufacturing and marketing strategy has been given a strong focus but there still remains a weak point; the manufacturing strategy is aligned in a reactive way or marketing is the leader, manufacturing the follower.

We argue that to align manufacturing and marketing strategy successfully in a long term perspective the functions have to be treated equally important. Therefore the formulation of functional strategies has to be a unified procedure, based on factors that are equally relevant for manufacturing and marketing. As market segmentation is a key step for strategic decisions (Berry et al., 1991; Hill, 1989) we claim that the inclusion of the manufacturing perspective should be done at this point. Step one of Berry et al.'s framework (1999) includes the market segmentation and the authors state (p.3603): "We want to know who they are; what they buy from our product line; when, where and how often their purchases occur; why they buy, that is, what benefits they seek; and how they buy which means what is their buying process." As stated above, the questions are purely marketing based and the importance for manufacturing is not as relevant as needed. The segmentation based on these questions can lead to products asking for conflicting manufacturing tasks leading therefore to a complexity in manufacturing

that isn't efficient anymore and negatively influences the profitability. It is the goal of this research to discuss the underlying segmentation dimensions that are relevant for marketing as well as manufacturing.

The problems stated above are also reflected in the discussion around two different research streams, the market and the resource based view. To get a deeper understanding of the different views, the following section highlights the implications of the two research streams. The combination of the market and resource based view finally leads to requirements for the strategy process.

Why choosing between market and resource based view?

Looking at the two research streams resource and market based view leads to further insights why the link of manufacturing and marketing strategy isn't as strong as it is claimed in theory. Whereas the market based view proposes that firms reach competitive advantage through identifying external opportunities and then aligning the firm with these opportunities (Porter, 1980), the resource based view of competitive advantage suggests that the firm should assemble and deploy appropriate resources that provide opportunities in the market (Hayes & Clark, 1985). In both research streams the linking of manufacturing, marketing and corporate strategy is crucial although the process of the alignment is different. We claim that the combination of the market and resource based view into a joint framework combines the strength of both of the research streams as well as abandons the weaknesses. A strategy that is only market-driven leads to a dissonance between the strategic intent and the operational capabilities (Hamel & Prahalad, 1994). This is a weakness identified in the conceptual model of manufacturing strategy in its context as stated by Ward et al. (2000) and Berry et al. (1999) where the manufacturing strategy is defined purely top down. The manufacturing function has to be looked at as an opportunity as well as a constraint. The manufacturing capabilities as seen in the resource based view can lead to competitive advantage. There can also be a constraint to

market opportunities as needed capabilities can be lacking e.g. know-how, machines, capacity etc. However, adopting an entirely resource based approach to strategy is as well inadequate because the competitive advantage still ultimately rests in meeting customer requirements (Brown et al., 2005). Therefore, the process of linking manufacturing and marketing strategy hasn't to be purely top down but a simultaneous procedure conducted by manufacturing and marketing managers.

As stated above, the critical issue of manufacturing strategy is to combine manufacturing capabilities with market requirements, which leads to the following four key objectives:

- Manufacturing strategy must be aligned with corporate strategy to support the goals of the corporate unit (Brown et al., 2005; Hayes & Wheelwright, 1984; Skinner, 1969; Ward, Bicklord, & Leong, 1996).
- Manufacturing strategy must be aligned with other functional strategies e.g. marketing strategy (Berry et al., 1994, 1999; Brown et al., 2005; Hill, 1989; Menda et al., 1997).
- Manufacturing managers must be included in the strategy formulation and implementation process to secure the inclusion of the potential and constraints resulting from the manufacturing capabilities (Brown et al., 2005).
- Manufacturing relevant criteria have to be included in the market segmentation procedure to derive customer segments, relevant for manufacturing and marketing.

We claim that not enough attention has been paid on how manufacturing and marketing strategy can be simultaneously aligned into a unified framework. An integrated framework helps to align the different perspectives of marketing and manufacturing managers and ensures furthermore, that the potentials and constraints of manufacturing capabilities are part of the strategic discussion. As it is the goal of this study to derive underlying dimensions of customer segments, we have to look at research studies that had similar perspectives. Manufacturing

strategy researchers often have studied strategic groups and configurations with the goal to group similar manufacturing strategies (a review is given from Frohlich & Dixon (2001)). As the strategies often are defined through competitive priorities the goal is comparable to our task. Competitive priorities as quality, delivery, flexibility and costs are customer requirements which have to be fulfilled to gain new offers. The definition of configurations is similar to the second step of Berry et al.'s framework (1999) which contains the definition of the relevant competitive priorities. As a starting point we therefore can look at research results that not only define configurations but also analyze the underlying dimensions. The following section highlights dimensions used from different authors, leading finally to suggestions concerning the underlying dimensions for customer segmentation which are relevant for manufacturing and marketing strategy.

Relevant dimensions for a market segmentation based on a manufacturing and marketing perspective

Although not as often used as in corporate strategy literature, manufacturing strategy configurations have generated a great deal of interest in manufacturing strategy (Bozarth & McDermott, 1998). Configurations are used as description and explanation models to identify similarities and dissimilarities and furthermore to reduce the surveyed complexity (Bailey, 1994).

Based on the literature review of Bozarth and McDermott (1998) as well as Cagliano et al. (2005) the configurations which define the dimensions underlying the types have been analyzed further, leading to testable hypotheses. Out of the configurations identified by twelve authors (Cagliano et al., 2005; De Meyer & Ferdows, 1990; Frohlich et al., 2001; Hayes & Wheelwright, 1979; Hill, 1988; Kathuria, 2000; Kotha & Orne, 1989; Miller & Roth, 1994; Richardson, Taylor, & Gordon, 1985; Stobaugh & Telesio, 1983; Sweeney, 1991; Ward et al., 1996), only three researchers discuss the underlying dimensions (Kotha et al., 1989; Richardson et al., 1985; Sweeney, 1991) whereas the others build clusters based on existing strategies or look at the content of the strategy (e.g. competitive priorities) in an isolated manner.

Richardson et al. (1985) developed a classification based on six mission statements and four manufacturing tasks. The six corporate missions differentiate on the basis of three principle characteristics: product volume, product variety (focus), and degree of innovativeness. The manufacturing task, named as New-Product centred, customer innovator, cost-minimizing job-shop, and cost-minimizer are described through the factors volume of output, cost per unit, quality, delivery on schedule, labor productivity, ability to introduce new products, flexibility to product specification changes, and flexibility to volume changes.

Kotha and Orne (1989) defined a conceptual framework comprising 8 types of strategy based on three dimensions: process structure complexity, product line complexity and organisational scope. The product line complexity refers to the complexity and variety of the final products,

the volumes of individual products and end-product maturity. Process structure complexity refers to the degree to which the manufacturing process is mechanised, the degree to which the manufacturing operations are characterised by systemisation (data collection systems, tracking systems, monitoring systems, etc.), and the extent to which the various stages of the manufacturing process are interconnected. Organisational scope is defined through the number and geographic scope of the manufacturing facilities, the geographic coverage of the organisations marketing efforts, vertical integration, the number of different customer, market, and distribution channels and the scale, or volume of manufacturing operations.

The configurations derived from Sweeney (1991) are based on two dimensions, the customer service criteria and the manufacturing process design. The resulting four configurations are called marketer, reorganiser, caretaker, and innovator and are seen as the missing link to corporate strategy. The configurations are described through competitive priorities however the underlying dimensions aren't as clearly defined as from Kotha and Orne (1989).

The three configurations highlighted above include not only a description of the strategy content but looks as well at the underlying dimensions. Out of the discussed configurations Kotha and Orne (1989) are the ones with the most concrete definition of the underlying dimensions.

The following drivers can be derived out of the three studies:

- Complexity: The driver complexity is part of Kotha and Orne's (1989) process structure as well as product line dimension. Also Richardson et al. (1985) refers to complexity with the underlying dimension product variety (focus) as well as Sweeney (1991) with the dimension process design.
- Scope: Whereas the dimension organisational scope of Kotha and Orne (1989) is defined somewhat broader, including the number and geographic scope of the manufacturing facilities, the geographic coverage of the organisations marketing efforts, verti-

cal integration, the number of different customers, markets, and distribution channels and the scale, or volume of manufacturing operations the driver scope has an internal focus. The number and geographic scope of the manufacturing facilities, the geographic coverage of the organisations marketing efforts, the number of different customers, markets, and distribution channels are all external criteria which aren't as relevant for manufacturing decisions. Nevertheless the scope, including vertical integration as well as Sweeney's (1991) customer service have a clear manufacturing relevance and are therefore included.

- Product life cycle: Kotha and Orne (1989) have included end-product maturity as a factor of complexity. Although this conclusion is logical we claim that it has not only a influence on complexity but as stated by Hayes et al. (1979) is crucial for choosing on the relevant manufacturing processes. Whereas a new product requires often a job shop structure, products with a higher market maturity ask for more efficiency where a continuous line is crucial (Hayes et al., 1979). We therefore want to test the dimension product life cycle as an individual dimension.

Based on the claim to integrate the manufacturing perspective right from the beginning on, and therefore using manufacturing strategy as a competitive weapon leads to an adapted framework and methodology of manufacturing and marketing strategy (see Figure 3). Based on the case study result two research goals shall be achieved. The first goal is to answer the three questions *"Is complexity a relevant dimension for customer segmentation?"*, *"Is scope a relevant dimension for customer segmentation?"* and *"Is the product life cycle a relevant dimension for customer segmentation?"* whereas the second goal is to test the adapted framework and methodology to align manufacturing and marketing strategy.

The adapted framework and methodology to align manufacturing and marketing strategy

The adapted framework and methodology of manufacturing and marketing strategy includes a combination of manufacturing, marketing and corporate strategy perspectives. Therefore, the top down approach as stated by Ward et al. (2000) as well as Berry et al. (1999) isn't suitable anymore. The adapted framework contains the following four main steps:

1. Concretize the dimension for customer segmentation based on a manufacturing perspective
2. Analysis of the derived segments
3. Discussion and evaluation of strategic alternatives
4. Deriving implications for manufacturing, marketing as well as the corporate strategy

The main difference to the framework of Berry et al. (1999) (see Figure 2) is the integration of manufacturing into the segmentation procedure, leading to customer segments not only relevant for marketing but as well for manufacturing. Furthermore the third step, the discussion and evaluation of strategic alternatives influences directly the corporate strategy. As we will elaborate later on, the strategic alternatives range from a cost-leadership to a technological innovator strategy (based on differentiation) and therefore leading to a new or adjusted corporate strategy. Figure 3 shows that the integration of the manufacturing perspective isn't reactive in a top down approach anymore but right from the beginning which is a precondition using manufacturing as a competitive weapon.

#	Task	Corporate Perspective	Manufacturing Perspective	Marketing Perspective
1	Concretize the dimension for customer segmentation based on manufacturing perspective		X	X
2	Analysis of the derived segments: <ul style="list-style-type: none"> • Volume • Return • External success criteria • Needed and existing capabilities 		X	X
3	Discussion and evaluation of strategic alternatives	X	X	X
4	Implications for corporate, manufacturing and marketing strategies	X	X	X

Figure 3: Adapted framework and methodology to align marketing and manufacturing strategy

The case study, as stated in the following section, shows the realization of the procedure, leading to an integrated manufacturing, marketing and corporate strategy.

Methods and Data

This research involves a case study of Aluminum Inc., a Swiss producer of aluminum parts. Aluminum Inc. is a privately hold company and employs 300 people. In 2004, Aluminum Inc. generated revenues well over CHF82 million. We conducted a qualitative study over six months that involved direct observation of key parts of the corporations redesign process. The setting was chosen due to conceptual reasons rather than because of its representativeness (Miles & Huberman, 1994). To study and understand in depth the linkages of corporate, manufacturing and marketing strategy, a company has been chosen that has been planning to redesign it's corporate as well as functional strategies. A qualitative, case-based approach was taken because it is the goal of this study to investigate "how" corporate, manufacturing and marketing strategies can be linked (Yin, 1994). Using a case study approach allows to investigate relationships in depth and in their original context (Punch, 1998).

To gain an in depth understanding of the linkages of the functional strategies, we used multiple sources of evidence: archival data, industry publications, company documentations, workshop participation and interviews. The research started in March 2005 when the top management of the company was highly under pressure. The owner as well as the bank asked for transparent and clear corporate and functional strategies. Because of an immense daily workload the management sought academic input of the author's research institute. So, we had access to rich data, and supported as well the strategy redesign process (see also Deflorin & Friedli, 2006).

Linking Corporate, Manufacturing and Marketing Strategy - Findings of a case study research

Starting position

Since the end of 2003, Aluminum Inc. has been in a difficult situation. Parallel to a moderate market growth the financial situation was precarious. The year 2004 was the year of different restructuring activities with the short handed goal to lead the company back into the winning zone. Although the management succeeded, the long term strategy was still missing. The following list describes the starting position in the beginning of 2005:

- The financial turnaround is on track.
- There are a lot of inefficiencies and problems in the daily activities.
- The company has compared to competitors quality as well as reliability and cost problems.
- The market positioning isn't transparent (stuck between a differentiation and cost driven strategy due to lacking differentiation capabilities)
- Due to a lacking long term strategy, investments have been delayed.

Based on this starting position the management agreed that there is an urgent need to design a transparent corporate strategy as well as coherent functional strategies. Whereas the manufacturing as well as the marketing strategy will be looked at in depth, the human resource, financial and IT strategies will be excluded. Although these strategies are important as well, the analyzed company claimed, that the biggest improvement potential lies in the formulation and implementation of concerted corporate, manufacturing and marketing strategy.

Step 1: Concretize the dimension for customer segmentation based on manufacturing perspective

As stated above, the combination of manufacturing and marketing perspective is reached through a combined segmentation of the products produced. The existing market segmentation was solely marketing driven and included eight segments.

Segments	2004 Percent of tons produced (%)
Automotive	7
Construction (Exterior)	25
Construction (Internal)	7
Electro- Technique	10
Household & Office	2
Machine construction	25
Transportation	1
Diverse	23

Figure 4: Marketing based segments of Aluminium Inc.

The company faced an immense product mix complexity, having a product range of 3000. Furthermore, sales agents tried to sell as much as they could to support the financial turn around. This attitude as well as the non transparent market position finally resulted in a product mix which included the whole range in between a simple mass production product with a high volume as well as a complex product with small batches. Combined with a lack of reliable processes, this led to a complexity level the company wasn't able to absorb any more. Due to the experience, that a wholly marketing based segmentation and the resulting market

positioning doesn't make use of the potential of the manufacturing as a competitive weapon the project team decided to derive a market segmentation, using the literature based dimensions complexity, scope and product life cycle as underlying dimensions. To be able to test if the three dimensions lead to mutually exclusive segments of customer orders, the dimensions have to be concretized (see Table 1).

Dimensions	Underlying variables
Product complexity	<ul style="list-style-type: none"> - Tolerance requirements (form, position, length) - Surface requirements (grade A, B or C) - Material feature (alloy, hardness)
Scope	<ul style="list-style-type: none"> - Number of process stages - Services
Product life cycle	<ul style="list-style-type: none"> - Product maturity (low, moderate, moderate to high, high)

Table 1: Segmentation dimensions and underlying variables

Step 2: Analysis of the derived segments

The second step includes the in-depth analysis of the segments with the goal to check if the segments are clearly distinguishable from each other and furthermore to reach a deeper understanding of the critical criteria (competitive priorities) as well as the capabilities needed to serve these customer needs. The needed capabilities are compared with the existing capabilities, leading to the gap of capabilities needed to fulfil the customer requirements. This second step of our adapted framework is comparable to the second as well as the third step of the framework of Berry et al. (1999).

The top management confirmed that the derived dimensions complexity, scope and end product life cycle are important for manufacturing but there had to be an evaluation if the resulting clusters were really differentiating. To visualize the clusters, the dimensions are presented in a cubicle (see Figure 5).

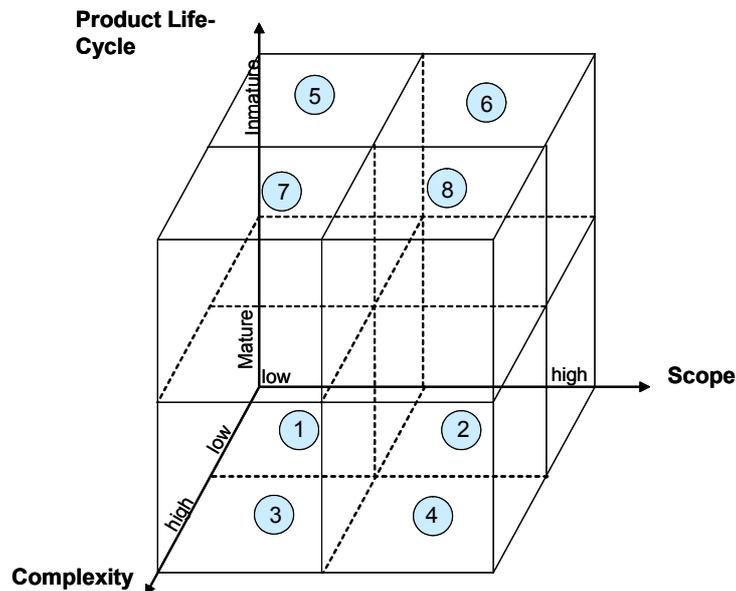


Figure 5: Segmentation cubicle

The products of segment 1 are so called commodities (low complexity and a low number of process stages used). Furthermore customer of the segment 1 are facing a mature market whereas customer of the segment 5 have the same scope and complexity features but are facing an immature market. Segment 2 products have as well a low complexity but need a higher number of process stages whereas segment 3 products have a high complexity but need only a few different process stages. From a production perspective, the offers of segment 4 are the most critical ones, having not only a high complexity but also using a high number of different process stages. The four segments 1, 2, 3 and 4 are all facing mature markets where price sensitivity is much higher than in immature markets. The customers of the segments 5, 6, 7 and 8 are working in immature markets, therefore asking more engineering activities than their counterparts. Products of the segment 6 have a low complexity but are using further processing activities. Segment 7 is the opposite of segment 6, including products with a high complexity and a low number of process stages. Segment 8 products have a high complexity and need a high number of process stages.

To get a deeper understanding of the usefulness of the derived segmentation criteria, the customer orders have been divided up into the segments. The allocation of the customer orders into the eight segments was transparent; there were only a small number of customer orders which had to be discussed to find the appropriate allocation. Table 2 shows the assignment of the customer orders based on sales, quantity, profit and sales forecast.

Segment	1	2	3	4	5	6	7	8
Sales 2004 (Mio. CHF)	15.2	14.9	5.3	5.2	5.1	5.8	9.8	18.1
Volume (Mio. tons)	2.9	2.7	0.9	0.4	0.8	0.5	1.3	1.9
Profit 2004 (Mio. CHF)	1.0 (6.8%)	1.8 (12.7%)	0.6 (11.8%)	1.3 (25.9%)	0.9 (18.1%)	1.7 (30.9%)	1.4 (14.7%)	4.3 (24.2%)
Sales Forecast 2004 (Mio. CHF)	16.1	13.0	3.5	9.0	5.0	5.0	8.7	17.4

Table 2: Sales 2004, quantity 2004, gross profit 2004 and sales forecast 2005 (1 CHF approx. 0.8 US\$)

The segmentation procedure of the custom orders of the year 2004 made clear two points. First, the derived dimensions and the underlying variables lead to distinctive segments. Second, the gross profits clearly show the different financial potential of the segments leading to the conclusion, that in future a prioritized handling of the orders seems favourable. This conclusion is as well supported by the statement that the product mix complexity has led to immense problems in the manufacturing department. To be able to choose the relevant segments, they have to be analyzed in depth and out of different perspectives.

Although the financial perspective is important for choosing the relevant segments, there are other points to consider as well. As stated above, the market as well as the resource based view are relevant. Out of the market based perspective it has to be considered which criteria are relevant to win the orders. Therefore the marketing manager has to define which kind of competitive priorities are relevant in the segments. Out of the resource based view, the production manager has to derive which capabilities are needed to fulfill the competitive priori-

ties as well as which capabilities are already build up. Furthermore, looking at existing capabilities as well as easy to build up capabilities it has to be considered if there are capabilities which could offer other market opportunities not reflected in the segmentation (see Table 3).

	Competitive Priority	Needed Capabilities	Aluminium Inc. Capability Gap
Segment 1	- cost	<ul style="list-style-type: none"> - Continuous process improvement - Reliable and constant accounting processes (cost unit) - Lean and controlled processes (pull-principle), optimization of running times - Low level of waste across all processes - Purchasing of raw material at competitive prices - Productive and economical utilization of facilities 	<ul style="list-style-type: none"> - Improvement of productivity - Coordinated process improvements - Reliable and transparent accounting processes - Lean and controlled processes (pull-principle), optimization of running times - Low level of waste across all processes - Improvement of purchasing activities
	- time to market	<ul style="list-style-type: none"> - Clear understanding of customer's requirements (regarding material, functions, quality etc.) - Technical condition of equipment and maintenance - Motivated and capable employees (committed and up-to-date) on all levels (from sales to production) - Specifications have to be met - Adherence of planning processes - Adequate planning and order tracking system (integrative and quick reaction) 	<ul style="list-style-type: none"> - Improvement of maintenance to reach more reliable processes - Modernisation of coating machines - Modernisation of the control of the older pressing machines - Improvement of adherence of planning processes - Adequate planning and order tracking system (integrative and quick reaction)
	- process dependability	<ul style="list-style-type: none"> - Well qualified employees (handling of equipment) - (process) reliability of equipment - Technical condition of equipment and maintenance - Motivated and capable employees (committed and up-to-date) on all levels (from sales to production) - Understanding of logistic processes - Alignment of logistic processes in accordance with customer needs - Process dependability - Adequate planning and order tracking system (integrative and quick reaction) - Capability and willingness to understand customer characteristics (corporate culture etc.) - Capability to credibly communicate business excellence 	<ul style="list-style-type: none"> - Improvement of employee motivation - Improvement of the understanding of logistic processes - Improvement of the alignment of logistic processes in accordance with customer needs - Adequate planning and order tracking system (integrative and quick reaction). 30% of the operations have an unplanned breakdown! - Capability and willingness to understand customer characteristics (corporate culture etc.) - Capability to credibly communicate business excellence
Segment 2	- time to market	See segment 1	
	- process dependability	See segment 1	
Segment 3	- cost	See segment 1	
	- process de-	See segment 1	

	pendability		
	- technical competence	<ul style="list-style-type: none"> - Analytical and holistic thinking - Well educated employees on all levels - Customer service: capability to identify and understand the technical needs of the customer and to translate it into the internal language - Production planning: definition of processes according to the need of the customer - Fabrication/check: awareness of feasibility and possibilities of implementation as well as technical limitations - Explicit and binding formulation of requirements - Know-how of norms, specifications and testing procedures 	<ul style="list-style-type: none"> - Development of technical skills → Introducing a new function (product manager) - Improvement of the capability to define procedures according to customer specifications - Explicit and binding formulation of requirements - Know-how of norms, specifications and testing procedures
Segment 4	- process dependability	See segment 1	
	- cost	See segment 1	
	- technical competence	See segment 3	
Segment 5	- time to market	See segment 1	
	- development and consultancy competences	<ul style="list-style-type: none"> - Well qualified employees within process development and advisory service - Competence in consultancy in technical areas (compression and further processing) - In depth knowledge of materials, extrusion, and further processing - Ability to realize challenging requests - Know-how in the field of legal and compliance - Capability and willingness to understand customer characteristics (corporate culture etc.) 	<ul style="list-style-type: none"> - More transparency concerning decisions and processes - Knowledge of standard procedures and maintain them - Capability and willingness to understand customer characteristics (corporate culture etc.)
	- cost	See segment 1	
Segment 6	- time to market	See segment 1	
	- development and consultancy competences	See segment 5 plus additional gap: <ul style="list-style-type: none"> - Improvement of competence in consultancy in further processing - Improvement of competence in further processing - Improvement of competence in materials 	
	- one-stop-shopping	<ul style="list-style-type: none"> - Distinct positioning (clearly defined product and service range) - Aluminium Inc. as the contact point for customers - Synchronization of consultancy and internal order processing with regard to general contractor activities 	<ul style="list-style-type: none"> - Distinct positioning (clearly defined product and service range) - Aluminium Inc. as the contact point for customers - Synchronization of consultancy and internal order processing with regard to general contractor activities
	- process dependability	See segment 1	
Segment 7	- technical competence	See segment 3	
	- development and consultancy competences	See segment 5	

	- time to market	See segment 1
Segment 8	- technical competence	See segment 3
	- development and consultancy competences	See segment 6
	- time to market	See segment 1

Table 3: Competitive priorities, needed capabilities and existing gap of capabilities

The derived competitive priorities as well as the analysis of the capabilities show, that to serve all segments, a lot of diverse capabilities have to be build up. The table of the sales distributed between the segments (see Table 2) shows that at the moment the company serves all of the eight segments. Based on the capability gap as well as the challenging problems the company is facing a more focused positioning of the company is needed. The next step includes the evaluation of strategic alternatives, leading finally to implications for corporate, marketing and manufacturing strategy.

Step 3: Discussion and evaluation of strategic alternatives

The third step, discussion and evaluation of strategic alternatives can have strong effects, influencing not only manufacturing and marketing strategy but also the corporate strategy. Including the manufacturing perspective into the segmentation activities can have implications on the market positioning of the company which results in a new or adjusted corporate strategy.

Looking at the existing customer base as illustrated with the segments clearly highlights the need for more focus. This is also supported by the lack of the capabilities that would be crucial to be successful in segment one or two. The existing complexity customer base and product mix furthermore eliminated valuable capabilities. Trying to fulfill the customer of segment one without loosing money has led to efficiency improvement programs which had negative influence on the quality level.

The focus on a single segment wouldn't generate enough volume; therefore combinations of the segments have been derived. Looking at the external success criteria of the individual segments as well as the needed and available capabilities has led to five possible strategies: the cost leadership strategy (V1), service leadership (V2), general contractor (V3), technological innovator (V4) and a hybrid strategy (V5).

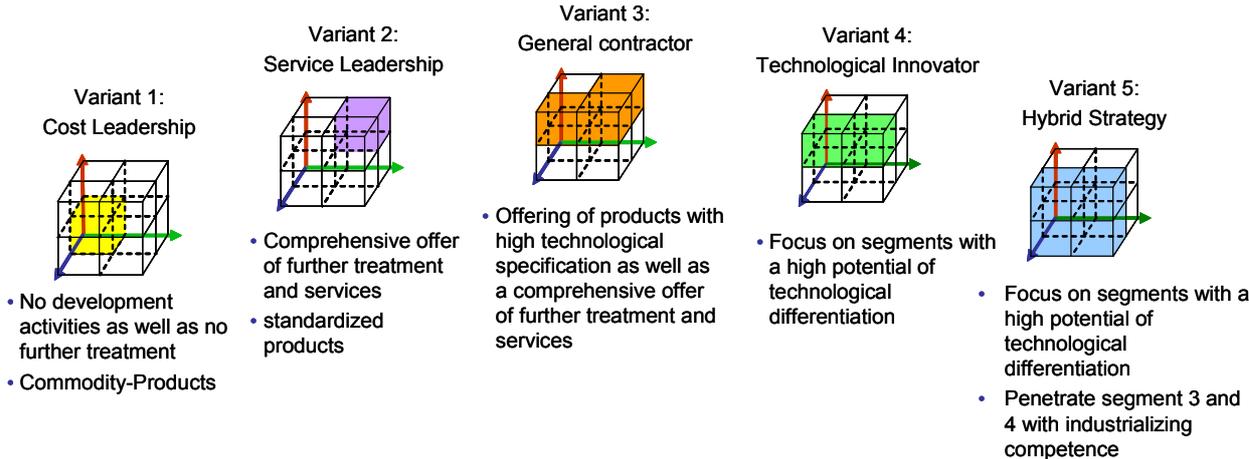


Figure 6: Visualization of the strategic alternatives

As mentioned above, the successful management of an industrial company needs the integration of manufacturing, marketing and corporate perspective. Therefore, relevant decision criteria for choosing the appropriate strategy have to be derived out of these perspectives. These criteria can also be looked at as constraints. A company that wants to serve only a niche market with a limited market volume will soon have liquidity problems. Therefore the expected market volume is obviously a constraint.

To bring together the different perspectives we have derived different criteria, based on the work of Brandenburg (2002). The derived clusters of criteria are market based, R&D based, manufacturing based, and strategy based (see Table 4; see Appendix for the detailed likert scale).

Each member of the top management evaluated the five strategies. The strategy technological innovator had the highest scores. Out of the discussion it was clear that the technological innovator strategy has a promising market potential and is based on manufacturing strengths. The top management called this strategy a short to mid term strategy and highlighted that the long term strategy has to be the hybrid strategy. As it is unlikely, that the company can build up the needed manufacturing capabilities to implement the hybrid strategy in a mid term range it will be aimed at in the long term.

	#	Criteria	Prioritization	Strategy					
				V1	V2	V3	V4	V5	
External Perspective	Market based (total 100 points)	1	Expected sales volume (compared to the status quo)	15	60	30	45	15	30
		2	Competitor situation	15	15	30	15	45	30
		3	Suitability of exiting sales channels	12	12	24	24	36	36
		4	Technical consulting competence	12	36	24	24	24	24
		5	Influence of trends	6	12	18	18	18	18
		6	Customer value (added value)	10	10	20	30	40	30
		7	Acceptance of strategy	6	6	18	18	24	24
		8	Communication expense	6	24	18	6	18	12
		9	Impact on the ability to introduce new products	10	20	40	30	30	30
		10	Strength of brand/chance to reach a definite position	8	8	16	16	24	24
Internal perspective	R&D based (30 points)	11	Development capabilities	6	24	12	12	12	12
		12	Innovation partnership/ network	6	24	18	18	12	12
		13	Building up of proprietary technologies	6	12	12	18	24	24
		14	Technology Potential	6	24	12	12	12	12
		15	Usability of development synergies	6	6	12	12	18	18
	Manufacturing based (total 40 points)	16	Manufacturing competences (employee based)	5	10	10	10	5	5
		17	Manufacturing competences (machine based)	5	5	10	10	15	10
		18	Manufacturing capacity I	5	10	15	15	15	15
		19	Manufacturing capacity II (defined by layout)	5	5	10	10	10	5
		20	Synergies in manufacturing	5	5	15	15	15	10
		21	Procurement market	5	15	15	10	15	10
		22	Manufacturing capacity III (defined by space available)	5	15	10	10	10	5
		23	Production planning and control	5	4	8	12	4	12
	Strategy based (total 30 points)	24	Fit for production program	4	4	4	8	16	12
		25	Fit for market strategy	4	5	5	10	15	10
26		Fit for timing strategy	5	5	5	15	20	15	
27		Fit for strategy: "specialty casting"	5	4	4	8	12	8	
28		Fit for financial budgeting	4	4	8	12	16	8	
29		Discussion on location Mnziken/Reinach	4	4	4	8	8	8	
30		Organisation/process orientation	4	8	15	15	5	15	
				396	442	466	533	484	
Rank				5	4	3	1	2	

Table 4: Evaluation of strategic alternatives

To implement the technological innovation strategy there is a need to derive implications for manufacturing, marketing as well as the corporate strategy.

Step 4: Deriving implications for corporate, marketing, and manufacturing strategy

The strategy "technological innovation" as well as the underlying markets has different implications concerning the marketing as well as the manufacturing strategy. The next step therefore has to be the adjustments of the corporate, marketing and manufacturing strategies.

Implications for the corporate strategy

The corporate strategy builds the basis for establishing a clear strategic direction. This for the objectives will be different in essence and emphasis for each company (Hill, 1989). As mentioned above, Aluminium Inc. is lacking a clear corporate strategy. Based on the analysis the top management has decided to implement a transparent differentiation strategy including the following dimensions:

- *Basic strategic behaviour:* differentiating through innovative and unique products. Deployment of technological core competences as well as of capabilities in product development and consultancy in order to position itself as development partner. Long-term oriented establishing of industrialization competences to additionally serving segment 4 and 3.
- *Product/ market matrix:* innovative product and market development. Concentration on product portfolio and product life cycle. Market penetration of the relevant markets/customers of segments 7 and 8; innovative development of products/ markets through different application of technologies.
- *Product program:* acceptance of high product (and market) complexity with the object to offer different and unique products/services.

- *Growth orientation*: growth through new product development or through extension of existing product competences into new markets, respectively. Technological competences have to be established before capacity is extended.
- *Kind of cooperation*: Staying independent. Establishment of partnerships in the areas of technology development, surface, finishing and tool-technology.
- *Competitive behaviour*: aggressive in core activities (target: to be one of the top three supplier in all relevant applications), cooperative in support activities. Entry barriers: corporate brand and product brands, patented technologies, development resources and development partnerships, as well as quality standards.

Implications for the marketing strategy

As the existing customers of the company are scattered through all eight segments, it has to be reflected how each segment will be addressed. The main areas of a marketing strategy include the definition of the pricing strategy, the communication behaviour as well as the distribution channels (Berry et al., 1994; Hill, 1989).

Analysing the strategy "technological innovation" out of a marketing perspective leads to the following implications. Due to the focus on segments 7 and 8, the strategy results in a lower customer base, but shall raise the average sales margin per customer. Therefore, the key account management is an important success factor. The weak financial position makes it impossible to plan a sudden backing out because the missing income would even more weaken the financial position and finally leading to liquidity problems. The top management therefore has agreed that only if the sales forces successfully reach to capture more volumes the backing out can be started in a consequent manner. The exit therefore is prioritized based on the sales margin and second of the distance to the core segments.

The core segments of the corporate strategy involve segments 7 and 8 and expansion is the basic marketing goal. As these two segments are basic for the future development, the pricing has to include a reasonable margin. To strengthen these segments the chosen communication has to be active and based on success stories. The distribution channels have to cover whole Switzerland as well as the neighbour countries. Furthermore, an international key account management as well as agents have to be established to strengthen the market appearance.

In addition to the segments 7 and 8, the long term strategy includes the segments 3 and 4. As the capabilities to be successful in these markets as well have to be developed yet, the basic marketing goal is to keep the existing customer base without eroding the strengthening of the segments 7 and 8. As long as the expansion of the segments 7 and 8 isn't concluded, the communication concerning the customer of the segments 3 and 4 will be inactive but the pricing has at least to cover the costs.

The orders out of the segments one, two, five and six negatively influence the processes build up to serve the orders of the segments 7 and 8. Therefore these segments have to be consolidated and a high pricing strategy is chosen. As customers sometimes have orders that belong to different segments, the communication has to be careful. An immediate pullout could have a negative effect on the expansion in segments 7 and 8. Nevertheless there is no active marketing as well as a transparent prioritizing of these segments.

Implications for the manufacturing strategy

Out of the manufacturing perspective, the new strategy doesn't need investments in new capacity, internal logistic processes and layout changes. As the strategy is based on technological knowledge, the following investments are unavoidable. One of the older presses has to be replaced (P16). The presses P8 and P25 have to be overhauled. Furthermore to reach more efficiency, the process oriented manufacturing needs the artificial ageing and packaging di-

rectly after the pressing process. The technical requirements of the products (high complex) needs more truing processes, the needed processes as well as the machines have to be optimized.

Although the investments are modest the main gap lies in the development of the needed capabilities. The competitive priorities of segment 7 and 8 are technical competence, development and consultancy competences and on third position time to market. As shown in Table 3 there is a strong need to close the derived gap. To successful implement the technological innovation strategy, e.g. the development and consultancy know-how has to be strengthened, the processes have be set up in a more transparent way as well as the competences in the further processing have to be developed.

To implement the technological innovation strategy the manufacturing and marketing strategies have to be broken down into transparent initiatives.

Discussion

Based on the results of Aluminum Inc. the three questions *"Is complexity a relevant dimension for customer segmentation?"*, *"Is scope a relevant dimension for customer segmentation?"* and *"Is the product life cycle a relevant dimension for customer segmentation?"* can be affirmed. Each dimension has been put into concrete terms, using underlying variables. The resulting segments have been analyzed from a financial, from a market as well as from a resource perspective. The products can be clearly distributed into the segments and are financially significant. Some of the competitive priorities differ between the segments, some are similar. Looking at segment 7 and 8, both of them contain the competitive priorities technical competence, development and consultancy competences and time to market. Nevertheless the underlying capabilities to fulfill the competitive priorities differ, because segment 8 needs additionally capabilities needed for the further processing activities (varnishing, galvanization, mechanical steps, etc). Based on the resource perspective, the segments are clearly dis-

tinguishable. Therefore we come to the conclusion, that the dimensions complexity, scope and product life cycle are relevant segmentation criteria.

Furthermore, the single case study of Aluminum Inc. shows, that the adapted framework and methodology to align manufacturing and marketing strategy is a useful tool, helping the companies to use manufacturing strategy as a competitive weapon. The segmentation procedure with the manufacturing relevant criteria as relevant dimensions has far reaching implications. First, it helped to visualize the complexity of the product mix Aluminum Inc. is actually producing leading to a common understanding, that a clearer focus is needed. Second, the derivation of the competitive priorities of the segments showed that the segments contain different customer needs and therefore different capabilities are needed to fulfill the customer needs. The analysis of the needed and existing capabilities demonstrated that the company is facing quite a huge lack of needed capabilities. To build up manufacturing as a competitive weapon, action programs with the goal to build up the needed capabilities have to be derived. Third, the top management has decided to focus on segment 7 and 8 and long term additionally on segment 3 and 4. The segments all have a high product complexity, asking high level production capabilities. The top management has clearly decided to develop the manufacturing strength further to finally use the manufacturing as a competitive weapon.

In addition, the segmentation cubicle (see Figure 5) can be used as a long term strategy visualizing tool, where the customer base is presented in a transparent way.

Limitations

There is one major limitation to the study; the results stem solely from a single case study. Therefore the representation is questionable. To test the dimensions complexity, scope and product life cycle a bigger sample size is needed, based on a quantitative survey, which is our next goal. Furthermore it has to be tested if the dimensions complexity, scope and product life

cycle have relevance for different industries as well as for different countries. We assume that the dimensions are suitable for the machine, electrical and metal industry and that the results don't differ between the countries.

Conclusion and further research

The goal to use manufacturing as a competitive weapon needs the alignment of corporate, manufacturing and marketing strategy. The alignment of the functional strategies has often been a research focus (e.g. Berry et al., 1994, 1999; Brown et al., 2005; Vickery & Droge, 1993; Ward et al., 2000) but the alignment of the manufacturing strategy is mostly purely reactive, following the direction of the corporate and/or marketing strategy. Including manufacturing relevant dimensions into the segmentation procedure and therefore aligning manufacturing and marketing strategy simultaneously has far reaching consequences.

Combining the different perspectives brings together the strength of the functions. An entirely hierarchical process doesn't involve functional potentials and constraints as strong as needed. A hierarchical process as stated e.g. by Ward et al. (2000) and Berry et al. (1999) lacks the transparent involvement as seen in the case study presented above. Furthermore the lack of capabilities is analyzed, preventing the companies to implement a corporate and marketing strategy which can't be implemented successfully from manufacturing due to lacking capabilities, employees or even infrastructure.

The adapted framework and methodology is a suitable procedure to align corporate, marketing and manufacturing strategy. It helps furthermore to fulfill the claim to use the manufacturing strategy as a competitive weapon.

As mentioned above, the results have to be tested on a broader sample size, which will be the next research activities.

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Appendix

	#	criteria	Prioritization	1	2	3	4		
External criteria	market based (total 100 points)	1	Expected sales volume (compared to the status quo)	15	Lower	Equal	Higher	Much higher	
		2	Competitor situation	15	Competitive disadvantage	Intensive competition	Competitive advantage	Sustainable differentiation	
		3	Suitability of exiting sales channels	12	Low	Medium	High	Very high	
		4	Technical consulting competence	12	To be built	Partly available	Considerably available	Completely available	
		5	Influence of trends	6	Strong negative influence	Negative influence	Positive influence	Strong positive influence	
		6	Customer value (added value)	10	Low	Medium	High	Very high	
		7	Acceptance of strategy	6	Negative impact	Negligible impact	Positive impact	Very positive impact	
		8	Communication expense	6	Very high	High	medium	Low	
		9	Impact on the ability to introduce new products	10	Strong negative influence	Negative influence	Positive influence	Strong positive influence	
		10	Strength of brand/chance to reach a definite position	8	Low	Medium	High	Very high	
Internal criteria	R&D based (30 points)	11	Development capabilities	6	To be built	Partly available	Considerably available	Completely available	
		12	Innovation partnership/ network	6	To be built	Partly available	Considerably available	Completely available	
		13	Building up of proprietary technologies	6	Negative impact	Negligible impact	Positive impact	Very positive impact	
		14	Technology Potential	6	To be built	Partly available	Considerably available	Completely available	
		15	Usability of development synergies	6	Not usable	Partly usable	Considerably usable	Completely usable	
	Manufacturing based (total 40 points)	16	Manufacturing competences (employee based)	5	To be built	Partly available	Considerably available	Completely available	
		17	Manufacturing competences (machine based)	5	To be built	Partly available	Considerably available	Completely available	
		18	Manufacturing capacity I	5	No capacity	Scarce capacity	Adequate capacity	Capacity excess	
		19	Manufacturing capacity II (defined by layout)	5	Counteractive	Neutral	Supportive	Highly supportive	
		20	Synergies in manufacturing	5	Not usable	Partly usable	Considerably usable	Completely usable	
		21	Procurement market	5	To be built	Partly available	Considerably available	Completely available	
		22	Manufacturing capacity III (defined by space available)	5	Counteractive	Neutral	Supportive	Highly supportive	
		23	Production planning and control	5	To be built	Partly available	Considerably available	Completely available	
		Strategy based	24	Fit for production program	4	Counteractive	Neutral	Supportive	Highly supportive
			25	Fit for market strategy	4	Counteractive	Neutral	Supportive	Highly

				tive			supportive	
		26	Fit for timing strategy	5	Counteractive	Neutral	Supportive	Highly supportive
		27	Fit for strategy: "Spezialitätenginesserei"	5	Counteractive	Neutral	Supportive	Highly supportive
		28	Fit for financial budgeting	4	Counteractive	Neutral	Supportive	Highly supportive
		29	Discussion on location ME/RE	4	Counteractive	Neutral	Supportive	Highly supportive
		30	Organisation/process orientation	4	To be built	Partly available	Considerably available	Completely available

Table 5: Evaluation of strategic alternatives with detailed likert scale