

Market development of air and solid particle separation

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Abstract

Title

Market development of air and solid particle separation

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Background

The thesis was initiated by Alfdex, an oil mist separator manufacturer, to explore the organisation's possibility for expansion by adapting their product to separate air and solid particles. They are currently prototyping a new product without knowing what markets it would succeed in and thus have the need for an expansion strategy. The market possibilities for the new product were examined and analysed to give a well-founded recommendation for possible market development.

Purpose

Evaluation of potential markets for a new product, providing reasoning and recommendations as well as exemplifying new product introduction.

Method

A case research strategy was used, focusing on internal documents, online publications, literary reviews, and field research in the form of in-depth interviews with industry professionals. Agile project planning allowed the project the ability to adapt as the thesis was written parallel to the development of the prototype of the case product. The analysis was carried out by funnelling down the possible alternatives using relevant theory and professional input.

Analysis

The analysis was focused on the three aspects of Needs, Feasibility and Profitability, notably pointing out the importance of pressure, air flow, current business relations and volumes. The applications that included pressure and air flow that deviates greatly from current Alfdex product working conditions would require more adaptations of the prototype and thus a higher risk. Current customers filter needs were premiered as good markets as the Alfdex brand is strong with them and they are already a trusted supplier and can thus avoid some entrance barriers. As new product development is costly and a risk in itself, suitable markets needed to be large enough to be able to generate enough profit for Alfdex to adapt their product for that particular market.

Conclusions and recommendations

As the study is focused on a specific case it is difficult to make general conclusions. However the most viable alternatives will be those more closely related to the current business and with similar functionality, as this allows exploring advantage from experience and current business relations. This can be evaluated through the three aspects of Needs, Feasibility and Profitability, looking at what needs the product can fulfil, which of those are feasible to satisfy and lastly which that can be profitable to sell and produce. This ensures that the product will be satisfactory on the selected markets and that markets utilising positive synergies are prioritised.

Keywords

Alfdex AB, Business Development, Filter Markets, Filtration, Market Development, Marketing Strategy, New Product Introduction, Separator Technology, Solid Particle Separation

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1. CONTEXT

On a corporate level organisations can be developed in many different ways. They often choose between integrating horizontally by penetrating the current market still further or to diversify. Or on the other hand to integrate vertically into their value network by acquiring or developing substitutes to their current suppliers or customers. Diversification involves expanding by entering new product and market areas, usually into products or services related to the existing business. There are several ways to achieve this, either through in-house innovation, various ways of outside innovation or through mergers and acquisitions with or of other organisations.¹ A conceptual framework used for industry networks is to illustrate the network using two dimensions of horizontal and vertical technologies. Horizontal technologies are related to the function of a product or service, and embody the performance characteristics. These are functions that are first developed and then marketed. The technologies and attributes used here are often brand specific but the functionality is equal to the product features expected by the customer. These are often strongly related to the business concepts of the organisation that provides them, and a foundation for what makes the organisation competitive. Vertical technologies on the other hand are pure technologies, and follow technology disciplines and are developed in a field of engineering. A relevant exemplification is from the automotive industry where a vertical technology could be an air filter, while a horizontal technology would be stopping dangerous particles from reaching the engine.²

There are several different reasons for organisations to diversify. Growth in itself is not beneficial and diversification decisions should be carefully considered, as it must be profitable growth in order to be value-creating for the organisation. Creating value through diversification is done by finding synergy effects from having more than one business area, and could be one or many of the following:³

- Efficiency gains by using the organisations current resources and competencies on new markets or services. By extending the organisation's scope and exploiting these economies of scope, and fully using the existing resources and competences that might not be fully utilised value can be created. This can be applied to both tangible physical resources and intangible resources such as know-how and brand.

¹ Johnson, Gerry; Scholes, Kevan and Whittington, Richard. *Fundamentals of Strategy*. 2nd ed. Essex: Pearson Education Limited. 2012. p.135-141

² Karlsson, Christer and Sköld, Martin. The manufacturing extraprise: an emerging production network paradigm. *Journal of Manufacturing Technology Management*. Vol. 18. No. 8. 2007. P.912-932

³ Johnson, Gerry; Scholes, Kevan and Whittington, Richard. *Fundamentals of Strategy*. 2nd ed. Essex: Pearson Education Limited. 2012. p.135-141

- A special case of economies of scope is to utilise talented management level employees as much as possible. Corporate level manager's skills can be applied on different business with no common resources on the operating level.
- The internal processes of an organisation can be utilised if they are superior to those of the open market, even if the businesses do not have any operation level relationship with each other. This can often be seen in developing economies where well managed conglomerates can exist as they are able to develop management, mobilise investment and use networks in a way that stand-alone organisations cannot do on imperfect markets.
- Having a wide market portfolio can create competitive advantage through increased market power. If two competitors have similar product portfolios, they are unlikely to compete aggressively, as retaliation can be one on several different markets. Thus a diversified company discourages price wars and overly expensive marketing. A diversified company might also compete aggressively with competitors operating only on a few markets, as they can cross-subsidise a particular business in order to drive competitors out of business.

However, when expanding the organisation horizontally in the value network, it is important to achieve positive synergies, and to engage in activities or assets that can complement each other and create more value together than as separate entities.

Hazards in diversifying can be:⁴

- An organisation might seek to invest in new markets in order to find profitability if future profit in the core business is likely to be low. This however goes against finance theory, which states that it is better to give the surplus back and let shareholders decide for themselves what markets they want to invest in, as shareholders could then instead invest in the already strong players on those new markets.
- Diversification in order to spread risk is also a bad move for an organisation. Often stakeholders would like to spread their risk by investing in several different industries, and don't want each organisation to be diversified as well. Instead it is preferred that organisations focus on managing their core business as well as possible.
- It is also possible that individual managers seeking short-term benefits, such as managerial bonuses and prestige, can promote strategies of excessive diversification and growth onto new markets without any real relatedness or synergy effects.

⁴ Johnson, Gerry; Scholes, Kevan and Whittington, Richard. *Fundamentals of Strategy*. 2nd ed. Essex: Pearson Education Limited. 2012. p.139-141

The scope, or breadth, of the organisation gives the conditions for which the organisation is able to compete. An organisation's horizontal technologies are tightly linked to an organisation's business mission and strategies, thus constituting the foundation of the market positioning. Hence wide horizontal technologies will widen the organisation's competitive scope.⁵ Maximizing value by having the right spread is the goal of every organisation looking to make profit. Hence choices of which products and markets to pick are important for an organisation. It is a large step for an organisation to move from one to more business units, and careful consideration has to be undertaken in order to maximize value creation for the organisation.

1.1 BACKGROUND INFORMATION

1.1.1 WHY THIS PROJECT?

The area of market expansion and product innovation is an area of interest for the author. This project will use Alfdex AB (henceforth called Alfdex) as a case company. They are currently prototyping a new product without knowing what markets it would succeed in; hence they have the need for an expansion strategy. Following the process from product idea through prototyping and finding suitable market applications could fill out missing links in theory as all steps will be covered. This initial chapter will present the organisation Alfdex and how the problem came about. It will also outline the structure of the report.

1.1.2 ALFDEX AB

The company Alfdex is located in Landskrona in southern Sweden. Their product is based on their separation technology for cleaning crankcase gases. Customers are divided into either *on highway*, consisting out of manufacturers of trucks, medium-duty and heavy buses, and *off highway*, which are manufacturers of tractors, forestry equipment, generators, boats, combine harvesters, military vehicles, locomotives and construction vehicles. For most cases the Alfdex solution is applied to diesel engines, but also to electric generators. The majority of the sales are to external customers, but a small part of sales are to owning partners Concentric and Alfa Laval.

Alfdex started production towards users in 2004 as legislation regarding cleaning of crankcase gases was introduced in Korea and Japan. Similar legislation was introduced in the US in 2007 and later in 2014 also in Europe. This led to major increase in sales for Alfdex. Similar laws are expected to be introduced in other parts of the world within the next 2-10 years.⁶

⁵ Karlsson, Christer and Sköld, Martin. The manufacturing extraprize: an emerging production network paradigm. *Journal of Manufacturing Technology Management*. Vol. 18. No. 8. 2007. P.912-932

⁶ Alfdex AB. 2016. *Annual report*. 2015-01-01 – 2015-12-31. Bolagsverket (retrieved 2016-11-14).

1.2 INTRODUCING THE ALFDEX PROBLEM

Alfdex has so far been penetrating their current market, and focused on market development as they have geographically followed the introduction of harsher legislation on cleaning crankcase gases. Expansion has been going so well that Alfdex are now looking into other ways of expanding in order to maximise value created for stakeholders.

By using the strategic planning tool the Ansoff Matrix, Alfdex has devised a strategy for future growth.

In order to minimize risk Alfdex management decided to avoid conglomerate diversification, and focus either on product development or just continued market development. Product development, which led to this project, implies delivering modified or new products into existing markets, which gives a potential for relatedness and hence giving advantages compared to competitors.⁷

Hence Alfdex announced an internal competition amongst workers, a project called *Out-of-the-box*, where employees were asked to come up with ideas for new applications of Alfdex's current technology. Alfdex supplied the employees with a list of criteria that was necessary for a project to be considered:

- Possible sales volume had to be large enough while the product was not too large
- The market potential had to be large enough without it being a too big project
- It must be technologically feasible to solve the issue
- It must be on a market adjacent or related to Alfdex's current markets.
- There cannot be strong competition on the market already

Many of the employee suggestions were ruled out due to failing on one or many of these conditions, but one of the remaining suggestions was the suggestion for an *Intake air separator for engines*.⁸ Alfdex broadened the suggestion into including any separation of air and solid particles, and decided to take this suggestion into further consideration through prototyping and market analysis.

1.3 THESIS PROBLEM SPECIFICATION

This project was conducted alongside another Master thesis focusing on the prototyping and manufacturing of the considered new product. Collaboration with this

⁷ Johnson, Gerry; Scholes, Kevan and Whittington, Richard. *Fundamentals of Strategy*. 2nd ed. Essex: Pearson Education Limited. 2012. p.138-140

⁸ Alfdex AB. *Out-of-the-box*. Unpublished (retrieved 2016-10-26).

project has given valuable input in order to assess the functionality and other technical aspects of the product.

1.3.1 PURPOSE

The purpose of the project is to evaluate potential suitable markets for a new Alfdex product separating solid particles from air using Alfdex's separator technology. To provide a well-founded recommendation of potential applications to Alfdex's management and to give interested readers an example of a product introduction supported by established theory.

1.4 PROJECT OBJECTIVE

The goal is for Alfdex to identify a profitable market for a new product, and for students to explore an example of a strategic selection process for finding suitable markets for one's product and thus expanding an organisation in a value-creating way.

1.4.1 DELIMITATION OF THE PROBLEM

With the limited market knowledge and time constraints at the beginning of this project clear delimitations are needed. These delimitations are intended to ensure completion within the assigned time period and to neutralise practical limitations.

The empirical research will be delimited to Alfdex's new product idea separating solid particles from air and to current Alfdex customers. As the product is the origin for the demand of this study it is self-explanatory why it was chosen. Focus on current customers is necessary to get sufficient market information for the analysis. Not including other organisations operating on possible markets for the new product was to keep resource use and time at an acceptable level. This project will focus entirely on markets and market issues. In-depth technical issues and analysis of Alfdex's new product will not be included.

The analysis will be on the special case of Alfdex. Recommendations regarding diversification routes will be given but decisions regarding Alfdex management are not within the scope of this paper. As the focus is entirely on one case, specific results cannot be generally applicable.

1.4.2 OBJECTIVE

The project seeks to find, for Alfdex, the most desirable use of the new product. That is the use that affects the company in the most favourable way and thus maximizes value created for Alfdex shareholders. The paper will show the model of how this was found.

1.4.3 TARGET GROUPS

Targets for the thesis are Alfdex management and students studying a master of Industrial Engineering and Management in 5th year.

1.4.4 DELIVERABLES

The project will deliver a well-founded recommendation regarding how Alfdex would make best use of their new product, as well as be a guiding example of how a selection process can be undertaken for students. Other than this paper and the official presentation of it, the author will summarise the content into an *executive summary*, as well as hold a smaller presentation for the case company Alfdex management.

1.5 REPORT STRUCTURE - HOW TO READ THE REPORT

This paper starts out with a broad perspective, taking in all possible markets for Alfdex's new product. The scope then gradually narrows to finally make a clear recommendation for Alfdex's management. It is more the share amount of information that will provide difficulties for the unfamiliar reader than the actual complexity of the analysis.

The report starts by introducing the reader to the source of the problem through putting it into context and introducing the problem. Then the project plan and the used methodology are presented to further give the reader a solid background. In order to build an analysis on the given problem, a thorough presentation of theoretical tools for analysis is presented to the reader to give perspective and understanding of the analysis. The theoretical tools are applied to the case specific empirical data in order to construct a diversification strategy for the case company Alfdex. The real contribution to science is not necessarily the end recommendation, but rather the selection process in which diversification strategy tools are used in practice. This shows application of theory in practice. The report will follow the structure below:

Context

As presented above, this section gives an introduction and background information necessary for the problem.

Methodology

Presenting the work process conducted throughout the writing of the paper, showing the methods and strategy used for the analysis to be made.

Framework

This section shows the theoretical framework for both the business environment of Alfdex and the analysis of the empirical data.

Empirical data

The information collected through industry publications and websites, interview with industry professionals and Alfdex's staff. This describes the possible applications for Alfdex new product and relevant aspects for how the Alfdex solution would fit into these markets.

Analysis

Alfdex's options are valuated with input from the theory and insights from the theoretical framework and the collected empirical data.

Lastly the conclusions of the research and the general applicability of the findings are presented together with suggestions of further research.

2. METHODOLOGY

This chapter describes the used strategy and methods, and clarifies the choices made.

2.1 STRATEGY

The main reason for this research being done is that the Alfdex board has decided that Alfdex need to broaden their portfolio and diversify. In order to address the board's decision the case project was initiated. This approach gives the opportunity for an in-depth and holistic analysis of the specific case, and allows for both theory lead and discovery lead research. The approach was useful to the case as different methods were used to collect the data to analyse with the help of established theory.

As this project was carried out simultaneously with the prototyping of the case product, adjustments of the criteria were continuously made in order for the prototype to fulfil the market needs. As the situation is more dynamic than the average Master Thesis it will also be more complex. Traditional project management methods does not suffice here as the scope of the project cannot be well determined, instead there had to be agile project planning and management. Agile projects are characterised by a higher degree of uncertainty regarding the exact nature of the desired output. Agile project management is distinguished by close and continuing contact between the users and the developers, and the planning process is adaptive and iterative. Here project requirements are a result of interaction, and requirements, priorities, and limitations change throughout the project. Agile projects do provide more flexibility, but are also less efficient and interpersonal skills are needed for the collaboration to work.⁹

Case studies can often give academic value in how the result was reached and not the result in itself, which is true for this research. It is important to keep in mind that the conclusions are specific to the particular case. In order for generalisations to be made one has to take the specific market and organisation's position and modify the results accordingly. The representativeness of the Alfdex case is very depending upon how similar it is to another case.¹⁰

2.2 METHOD

Information was collected both through internal documents, online publications, literary reviews and field research. The information gathering can be divided into two major phases.

⁹ Meredith, Jack and Mantel, Samuel. *Project Management – A Managerial Approach*. 8th ed. Wiley India Pvt. Ltd. 2011. P.242-245

¹⁰ Denscombe, Martyn. *The Good Research Guide – For small-scale social research projects*. 5th ed. Open University Press. 2014. p.54-66

Initially the possible applications for Alfdex's new product had to be mapped out. This was done by studying the internal suggestions for product development to generate or use ideas for possible applications. In combination with relevant theory and several online publications by manufacturers of products which Alfdex could possibly substitute enough empirical data to have covered a wide spectra of applications was given. This gave the possibilities for markets which could exist for separation of air and solid particles.

The opportunity to conduct detailed discussions with different stakeholders are limited as the internal process of and results from new product development cannot be communicated freely before the final product is launched. Likewise the usage of existing sources are limited as new product development are focused on new needs and requirements from customers, intended to replace existing solutions that are provided by existing and potential competitors. The amount of business related restrictions both limits the number of interviews that could provide useful information for the project, and forced the most sensitive part of the collected data to be unpublished in the official report.

In order to find which of the defined market niches would be most suitable for Alfdex's new product, formal and informal meetings with Alfdex's product development engineer and the project responsible for the prototyping of the product as well as with product manager supervising this paper added criteria onto the initial project description. These meetings would help narrow down the selection, making the amount of choices small enough for deeper analysis.

The information provided by Alfdex and online publications of filter market organisations gave enough information to have a base to start doing field research, in order to map possible future customers. The primary research method here was in-depth interviews, and a total of three professionals at a current leading Alfdex customer were interviewed. Interviews were conducted together with the prototyping team, and there were pre-written questions, though there were not strictly followed. This allowed assessing leading customers' needs and demands, in order to predict Alfdex's potential for these new applications. Lastly these learnings were used to give advice on how Alfdex's management should launch their new product.

2.3 RELIABILITY AND VALIDITY

As secondary sources are used this will be stated clearly, as is practice for academic publications. Information that was gathered through online publications of industry organisations, often with news or product information targeting current market actors were treated as such and understood to be biased. Information gathered through interviews with industry professionals through questions related to their field was assumed to be true. Interview answers are not presented per person but as an overall

consensus amongst the interviewees, which lowers the validity of this primary data, but makes the information more compressed and easier to follow. For quality control the interviews were discussed with the student responsible for the prototype, in order to solve any disagreements regarding the information received in the interview.

3. FRAMEWORK

The search for relevant theoretic models for this project was conducted using mainly Google Scholar and Lund University's own library catalogue Lovisa. Several searches were made, and relevant ones included keywords: "*Business-to-Business Strategy*", "*Diversification*", "*New Market Introduction*", "*Competitive Strategy*", and "*Product Development*".

Models were chosen to describe and evaluate Alfdex and Alfdex's situation, focusing on finding success factors for the new product introduction and how Alfdex could make best use of their strengths.

3.1 KOTLER'S BUSINESS BUYER BEHAVIOUR

Most large companies sell their products to other organisations, as even large producers of end user goods must first sell to other businesses, such as wholesalers or retailers. Buying behaviour of organisations that buy products and services to use in their own production and are thus not end users is referred to as *Business buyer behaviour*. Business buyers control which products and services they need to purchase and then through the *business buying process* (shown below) they determine which among the alternative suppliers is most fitting for them. The process of finding, evaluating and choosing can include several different representatives for the organisation. Just as when selling to end users, organisations selling to business customers must also build and maintain profitable relationships through creating superior customer value. It is therefore important for business-to-business marketers to understand business buyer behaviour and business markets as far as possible.

The environment of the business markets differ from consumer markets in a number of ways. A business marketer often deals with a lot fewer but very large buyers, or at least a few large buyers account for most of the purchases made. The demand on business markets does not come directly from the customer, but is derived from the end-user, who wants a finished product. Therefore business-to-business marketers can promote their products either to the customers or to the end users in order to increase the demand. Hence many business markets have inelastic demand, and are not much affected by price changes. This as the demand will only change if the price changes for the end user as well. The demand is also more fluctuating and more quickly fluctuating, as small changes in end user demand can have large effects on business demand.

The buying process also differs from consumer markets. As the stakes are generally higher and the purchasing process more complex a business purchase involves more decision participants and a professional purchasing effort. This as the purchasing unit for larger purchases often consist of trained purchasing agents, technical experts and

top management. This process takes more time and is more formalised than a consumer buying process. There is also more interdependence between buyers and sellers, and it is not uncommon to work side-by-side for a long time customising their offerings to each individual customer need, as there is much at stake for both parties as they have invested time and personnel into the process. It is common for business suppliers to partner with their customers to solve their problems in new ways, and not just meeting their current needs, thus creating long-term relationships.

Business marketer wants to know how the buyer will respond to marketing stimuli. The figure below shows a simplification of the business buyer behaviour. The model shows how marketing stimuli together with other stimuli affect the buyer to produce a certain response. In order to produce good marketing strategies, business marketers must recognise what happens in the organisation to turn their marketing stimuli into purchase responses.

A buying activity consists of the buying centre, with all the people involved in the decision, and the buying decision process itself. As the model shows, the buying centre and decision process are affected by the internal organisational, interpersonal and individual factors as well as external environmental factors.

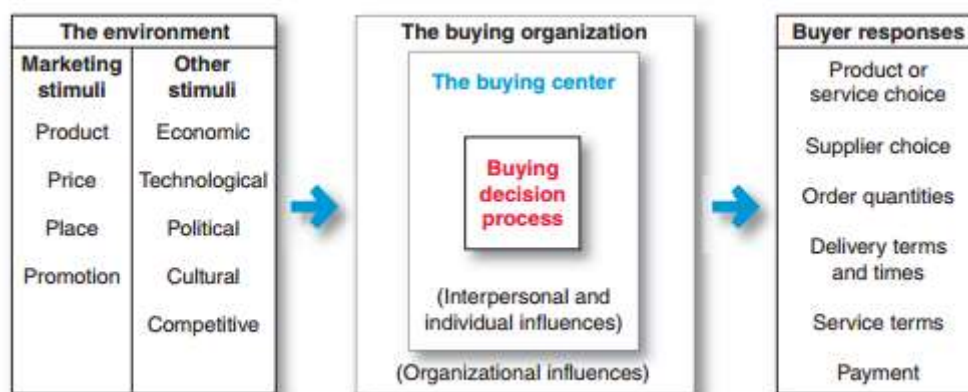


Fig.1 Kotler's model of Business buyer behaviour¹¹

For organisations to introduce new products, the buying organisation is faced with a new task situation. In these situations the size of the cost or risk for the buyer determines the number of decision participants and the organisation's effort to collect information. This is the business marketers largest challenge but also the largest opportunity. Hence the marketer needs to supply the buyer with enough help and information while also reaching the key buying influences that the buyer has in order to convince them to make the purchase.

¹¹ Kotler, Philip. *Principles of Marketing*. 14th ed. Prentice Hall. 2011. P.171

Due to the amount of work that is behind a new purchase, many business buyers buy complete solutions to their problem from one single seller instead of different separate products and services from several different suppliers. In these cases the sale often goes to the seller that offers the most complete system that meets the buyer's needs and solves their problems. This form of systems selling is often a key part of business marketing strategy.¹²

3.2 ANSOFF'S CORPORATE STRATEGY AND DIVERSIFICATION

Increased penetration of an organisation's existing market is more than often the most obvious strategic option. Increased market share on current markets with only the current product range builds further on the organisations already established strategic capabilities. This means less risk as the organisation does not leave their familiar areas. There are many known advantages of the strategy; experience curve benefits by continuing the same procedure as before, greater economies of scale as production increase, and increased negotiation power with both buyers and suppliers as ones market share increases. There are however drawbacks with the strategy. Competitors might try to defend their market share, and the increased rivalry might lead to price wars or increased marketing costs which is sub-optimal for all parties. This type of retaliation is more common in mature markets with low-growth, as increased market shares here are more likely to directly be on the expense of competitors. With this kind of growth there is also an increased risk for legal or economic constraints, as official competition regulators can take action against excessive market power or organisations can be forced to strategically withdraw to their most valuable segments and products during market downturn or public-sector funding crises.¹³

But if the organisation instead chose to diversify to grow it can focus on either product or market development. Developing the product to deliver a modified or entirely new product or service to its existing markets is called product development. Targeting the same market with new products gives the potential of relatedness as the customers already have a positive relation to the organisation. It does however often require new strategic capabilities from the organisation, such as processes or technologies that are new to the organisation. There's also always a risk with managing projects even in areas related to the current business. Delays and overdrawing the budget due to project complexity or changed specifications are factors to be taken into account.

Alternatively the organisation can offer the current products or services to new markets. That could be either new user markets or new geographic markets. Market development often require some type of product development as well, it could be just

¹² Kotler, Philip. *Principles of Marketing*. 14th ed. Prentice Hall. 2011. P.164-173

¹³ Johnson, Gerry; Scholes, Kevan and Whittington, Richard. *Fundamentals of Strategy*. 2nd ed. Essex: Pearson Education Limited. 2012. p.135-136

service or packaging changes, but sometimes more radical adaptations. In order to achieve successful market development it is important to know the critical success factors of the new markets, and that the product meets these. The drawbacks are similar to those of product development, as strategic capabilities can be insufficient. Different users and geographies can have different needs, and the right brand and marketing skills are needed in order to succeed with unfamiliar customers.

Lastly it is possible to develop through unrelated diversification, taking on new markets with new products. This is coupled with increased risk as there is no obvious way in which the organisation is better off for having this new product on a new market, as it drastically increases the organisation’s scope. Conglomerate businesses are often valued lower than the separate product and market combinations would be valued as stand-alone businesses. There is however always degrees of relatedness between different products and markets, and unrelated diversification is not always apparent as some relationships that initially seem beneficial can prove to be insignificant.

These corporate strategy directions are visualised by the Ansoff product/market-growth matrix.¹⁴

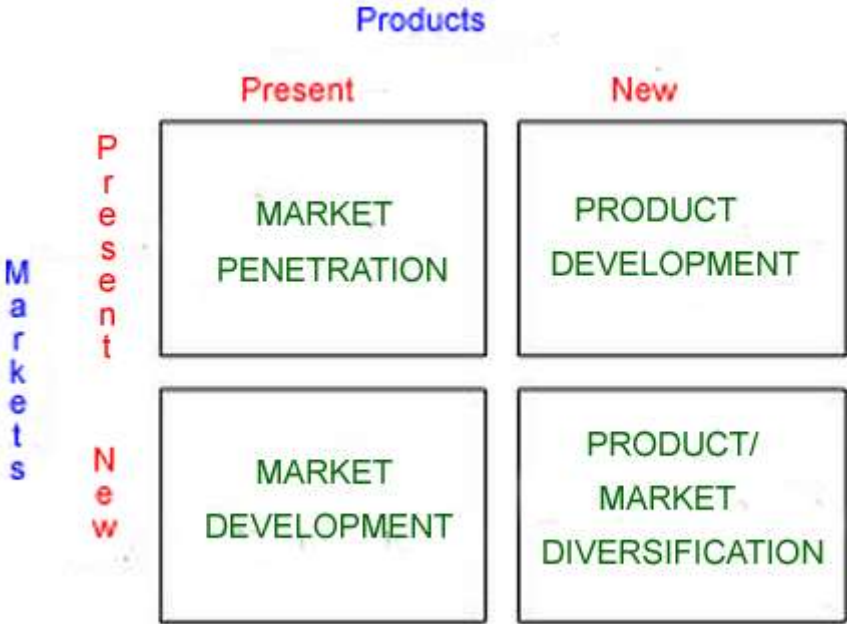


Fig.2 The Ansoff Matrix¹⁵

¹⁴ Johnson, Gerry; Scholes, Kevan and Whittington, Richard. *Fundamentals of Strategy*. 2nd ed. Essex: Pearson Education Limited. 2012. p.136-139
¹⁵ Ansoff Matrix Guide & Analysis. *What is the Ansoff Matrix*. <http://www.ansoffmatrix.com/> (retrieved 2017-01-30).

3.3 PORTER'S COMPETITIVE STRATEGY: GENERIC STRATEGIES

In order for an organisation to have a competitive business strategy, it needs to achieve competitive advantage in its field of activity. Competitive advantage is defined as creating value to one's customers that is both greater than the cost of supplying them with it as well as being superior to the offer from rival organisations. Both of these components are important features for competitive advantage. In order to be *competitive* it is important to give customers sufficient value enough that they will pay more than the cost of supplying it, and to have an *advantage* the value created must be greater than what is offered by competitors. If an organisation fails to deliver competitive advantage, they will be vulnerable to action from competitors offering better products or lower prices, which would make the buyer change supplier.

There are two ways of generating competitive advantage. Either an organisation can have lower costs than its competitors and thus offer lower prices, or they could offer products or services that are more valuable to the customers. There is however one more dimension to the model, regarding the scope of customers that the organisation chooses to serve. Organisations can either choose to focus on smaller customer segments, such as a specific demographic group, or to target a broader range of customers, across a wide range of characteristics.

As shown in the model below this gives three major generic strategies that will be representable for a wide range of business situations.

- The strategy of *cost-leadership* takes advantage of large economies of scale and cost discipline to serve a wide range of customers at a low price.
- The strategy of *differentiation* offers a specific niche product, which allows for a higher price in return for the increased value created for the customer.
- The third strategy is *focus*, which means a very narrow but competitive scope. Organisations can either have cost focus or differentiation focus, but the narrow scope differentiates this strategy from the first two.

Competitive Advantage

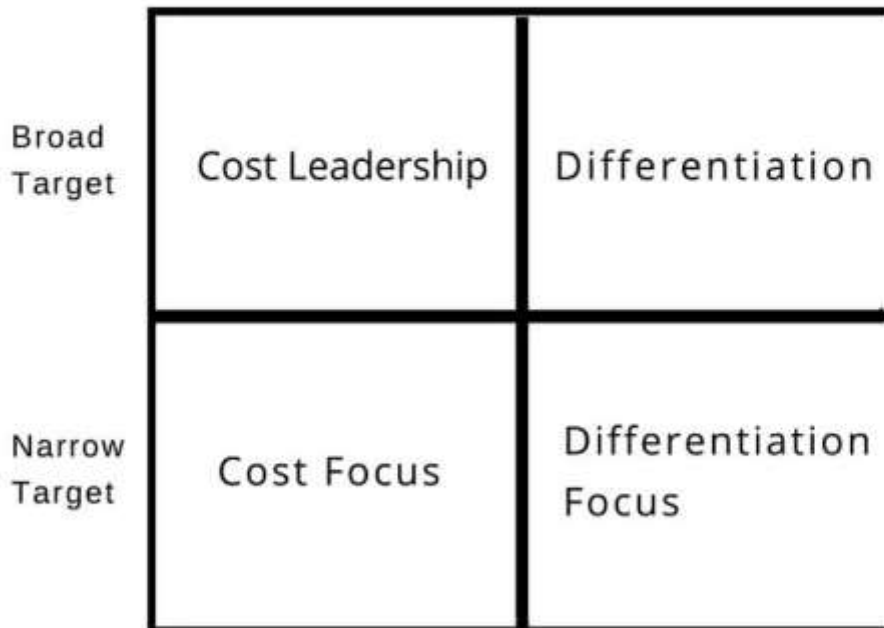


Fig. 3 Porter's Generic Competitive Strategies¹⁶

3.3.1 COST-LEADERSHIP

Becoming the lowest-cost organisation within a domain of activities can be achieved through four different key cost drivers:

- Input costs play a key part of the cost structure for most products. To lower labour or raw material costs many organisations locate labour-intensive activities in places with low labour costs or in places close to raw material sources.
- Economies of scale are important when there are high fixed costs, as increased scaling can reduce the average cost of operation. For a cost-leader it is important to reach an output that is equivalent to the minimum efficient scale. Increased output from here result in increased average costs, due to special overtime payments to workers or neglected equipment maintenance.
- Experience is also a key cost driver. The cumulative experience gained by an organisation will continuously decrease the average production cost. Experience

¹⁶ University of Cambridge – Management Technology Policy. *Porter's Generic Competitive Strategies (ways of competing)*. <http://www.ifm.eng.cam.ac.uk/research/dstools/porters-generic-competitive-strategies/> (retrieved 2017-02-07)

affects mainly two areas. Firstly, labour productivity goes up as personnel learn to carry out their activities cheaper. Secondly, designs and equipment are made more efficient as experience will show what works best. This has a number of implications for efficient cost-leader business strategy. It is important to enter a market early to have experience vis-à-vis competitors. It is also important to hold a market share as big as possible, as the increased volumes means increased cumulative experience. Lastly it is important to remember that there are theoretically no limits for cost reductions to be made, and contrary to economies of scale increased experience will always continue to be beneficial.

- Product or process design can initially be implemented to be efficient. Using standardised components or web-based selling points can cut down costs from the outset. The organisation's offer can also be tailored to suit just the most important customer needs and thus ignoring the less important needs. An important aspect here is to consider *whole-life costs*, referring to not just the purchasing costs but all subsequent maintenance and service that the customer will need.

In order for a cost-leadership strategy to be effective the organisation needs to maintain the *lowest* cost. Just having the second lowest cost structure means that there is a competitive disadvantage against one of the competitors. Though low cost should never be pursued in a total disregard for product quality. In order for the product or services to be sold at all they need to meet market standards. The organisation can meet the market standard and go for parity with competitors, setting the same price as the average competitor in the marketplace, using the cost advantage as increased profit. The organisation may also go for proximity to its competitors in terms of features, thus making cuts in price to compensate for the lower quality. This is only beneficial if the cost advantage still gets the organisation better profits than average even though they charge a lower price.

3.3.2 DIFFERENTIATION

The main alternative to cost-leadership is differentiation. Differentiation means focus on some uniqueness that is value enough for customers to accept a price premium. What uniqueness that is relevant for differentiation varies between different markets, and organisations can differentiate along different dimensions even within the same market.

To find potential for differentiation, a perceptual mapping of the organisations products or services against competitor's offerings can be used. It is imperative to clearly identify the strategic customer whose needs the differentiation strategy is based on. The right way of prioritising customers can be very valuable for identifying the right way of differentiation. However it is easy to draw too narrow boundaries when

comparing market niches. There is always a risk of losing market shares to more general retailers competing in the same product space.

Successful differentiation strategies usually involves additional investments for research and development, branding or quality staff, thus the total cost will most likely be higher than that of the average competitor on the market. Thus the organisation must make sure that the added costs for differentiation do not exceed the increase in price that the market will accept. One must be careful not to start adding additional costs that are not valued enough by customers. Differentiators must still keep costs down as much as possible, just as cost-leaders cannot totally neglect quality. Costs not clearly related to the source of differentiation must be very well motivated.

3.3.3 FOCUS

Targeting a small market segment and carefully adapt one's products or services to the needs of that narrow segment is called a focus strategy. This comes in two different varieties, depending upon how the competitive advantage is achieved, through cost or differentiation. Competitive advantage is here achieved by dedicating the organisation to give better service to their target segments, succeeding as competitors try to cover a broader market segment. Serving a wider range can lead to coordination problems, having to compromise or losing flexibility. Here a focus strategy can find the market segments neglected by the organisations using the strategies of cost-leadership or differentiation.

The two types of focus strategies are cost focus and differentiation focus. Cost focus relies on identifying an area where the broader cost-based strategies cannot meet the customer needs as they would require added costs and they are trying to satisfy a broader market. Differentiation focus instead relies on identifying specific needs that the wider differentiators miss. Through relying on one particular need, differentiation focusers can achieve specialist knowledge and technology, and increased service commitment and thus improve their customer loyalty and brand recognition.

Though in order to achieve a successful focus strategy, at least one of three key factors must be met:

- *Distinctive segment needs*, and if these distinctive needs wears away then it will be difficult to maintain ones market position and defend against competitors.
- *Distinctive segment value chains*, as it will strengthen the focus strategy if the value chain is either difficult or costly for competitors to mimic.
- *Viable segment economics*, as segments can shrink as conditions for supply and demand changes, which could make them too small to be economically viable to rely on.

3.3.4 LACK OF SPECIFIC STRATEGY

It is often a bad idea not to have a clear vision of which one of the strategies to follow. As said before, the lowest-cost competitor always has the possibility to undercut the second lowest-cost competitor. It is therefore often a bad move by an organisation seeking to gain competitive advantage through low costs to add some extra costs to try a bit of differentiation. And the same thing goes for a differentiator; it is unwise to cut costs that will jeopardise the basis for the differentiation. Lastly, it is bad for a focuser to try to move outside of the original narrow segment, as the specially tailored products or services will most likely have inappropriate features or costs for a new target segment. The danger of not sticking to one's initial strategy is to get *stuck in the middle*, thus not doing any strategy well, and customers will always have a better alternative.

It is easy for managers to make small decisions that can compromise their basic generic strategy. A cost-leader might want to increase margins or raise quality if business is going well, or a differentiator could be tempted to cut down on the essential research and development or branding investments that are essential for their strategy, in order to cut costs in a bad economy. This will make them lose their long-term advantage and consistency with the chosen generic strategy will provide a valuable check for decision-makers.¹⁷

3.4 PORTER'S FIVE FORCES FRAMEWORK

This framework is an aid in identifying how attractive an industry is in terms of five different competitive forces:

- The threat of entry.
- The threat of substitutes.
- The power of buyers.
- The power of suppliers.
- The extent of rivalry between competitors.

All together these forces can be seen as a foundation for an industry's structure. An attractive industry is here one that offers a good potential for profit. If the five forces are considered high then the industry is not attractive to compete in as there will be too much competition and pressure for profits to be reasonable.

The five forces framework can be useful for most organisations. It gives a good starting point for strategic analysis and when the level of attractiveness of an industry is

¹⁷ Johnson, Gerry; Scholes, Kevan and Whittington, Richard. *Fundamentals of Strategy*. 2nd ed. Essex: Pearson Education Limited. 2012. p.111-120

understood the five forces framework can help set an agenda for further action on the identified critical issues. Each of the five forces described in detail below:

3.4.1 THE THREAT OF ENTRY

The difficulty of entering an industry influences the degree of competition in that industry. The easier it is to enter the industry, the worse it is for the existing competitors in that industry. An industry that is attractive has high barriers to enter, which reduces the threat of new competitors entering the industry. The factors that influence how new entrants can enter the industry are often seen as barriers to entry. Typical barriers are:

- Economies of scale or experience can be extremely important in some markets. As once the competitors in an industry have reached large-scale production it will be difficult for new entrants to match their prices before getting up their volumes to a significant level as they will have a higher cost per unit. Scale is more important in industries with high investment requirements for entry, as it will lower the price per unit. Experience is important as it gives a cost advantage and until new entrants have reached the same level of experience they will likely produce at a higher unit cost.
- The access to supply or distribution channels is vital to enter an industry. In many markets there are manufacturers that can control these channels, either through direct ownership or through customer loyalty. In some cases these barriers can be bypassed by excluding retailers or distributors and sell directly to customers.
- The expected retaliation from current competitors on the market can make possible entrants reconsider as it would be too costly to enter. Retaliation could come in the form of price war or increased marketing. Often it does not come to this as just the knowledge of possible retaliation can be enough to act as a barrier for the market.
- Legislation or government action can be a legal barrier such as patent protection or market regulation, or direct action such as government tariffs. However these barriers can be removed by government legislation which can make existing competitors vulnerable to new entrants.
- Differentiation through quality or branding can also act as a barrier of entry, as it increases customer loyalty. Commodities without differentiation options will always be bought at the lowest possible price.

3.4.2 THE THREAT OF SUBSTITUTES

Substitutes are defined as products or services that give a benefit similar to that of an industry's established product or services, but through a different process. It is easy to get a sort of tunnel-vision and focus only on competitors within the industry, and thus neglect the threat of substitutes. Substitutes may either reduce the demand for a

specific type of product as customer switch over to the new substitute, or simply the risk of substituting can set a maximum limit for the price that can be charged for a product or service. If there is a high threat of substitution, then the industry will be less attractive.

The price/performance ratio is important to threats of substitution. Even if a substitute is more expensive, it will still be a viable threat if it can offer increased customer value. It is not just the price that matters, but the ration between the price and the observed performance.

Extra-industry effects are what the concept of substitution is about. Substitutes always come from the outside the industry, and the case of product innovation from current competitors is something else. The value in this concept is to force organisation to not just look at their own markets, but to consider possible outside threats and constraints.

3.4.3 THE POWER OF BUYERS

The buyers are an organisation's direct customer, but do not have to be the actual end user. In an industry with powerful buyers, they can demand cheaper prices or costly improvements for the supplier. It is important to distinguish between buyer and end user, as retailers and distributors have a lot more buying power than a single private customer, and can thus be a source of pressure for their suppliers.

If there are only a few large buyers in a market, or a few large customers that make up the majority of an organisation's sales, then the buying power is increased. If the product or service is also a big part of the buyer's total purchases, then the buying power is further increased, as they have even more incentive to constantly scan the market for the lowest price.

Buyers will also be more likely to change supplier if the cost of switching suppliers is low. Hence markets where it is easy to change between suppliers will have increased buying power. This is common for commodities, as they are not differentiated and can easily be bought from a different supplier.

Lastly, a buyer that could supply itself, or easily procure the ability to do so, will likely have high buying power. It is called backward vertical integration when organisations integrates sources of supply into their business organisation, and can happen if acceptable pricing or quality cannot be obtained from available suppliers.

3.4.4 THE POWER OF SUPPLIERS

The suppliers are an organisation's providers that supply the organisation with what it needs in order to produce the product or service. This could be raw materials,

equipment, consumables, labour or finance. The factors that increase the supplier's power are largely the opposite of those that gives the buyer high buying power.

If there are only a few large suppliers, the power of the suppliers is increased as it gives them a strong negotiation position.

Suppliers will also have increased power if there are high switching costs in the market. If it is costly for buyers to change supplier then they will become dependent upon their suppliers, and will thus be ready to pay a premium in order to avoid the costly change of supplier.

Lastly, suppliers have increased power if they can go around their buyers to move closer to the end user. This is called forward vertical integration, and if there is a possibility for forward vertical integration in the market then the suppliers will have increased power.

3.4.5 THE EXTENT OF RIVALRY BETWEEN COMPETITORS

Competitors are those that offer a similar product or service intended for the same customer group. There are a number of factors that affect the degree of rivalry amongst competitors in an industry:

- Competitor balance, as when there are competitors that are about the same size there is danger of intense rivalry as one will try to get a dominant position on the market. This can be one through aggressive price wars or intensive advertising, which will be costly for all parts. And stable markets usually have only one or two large organisations, where the smaller organisations does not directly challenge the larger one, but instead tries to focus on narrow segments.
- Industry growth rate, as when an industry is growing rapidly, then organisations will not have to compete as they can grow together with the market. But if there is little growth or the market is declining, then competitors will try to take market shares from each other instead. Therefore markets with little growth often have low profitability as there is a constant price war.
- High fixed costs, as these markets require high initial investments, thus needing high volumes to get a low unit price. This is likely to give intense price competition as cutting prices in order to get high volumes will force competitors to do so as well. The same thing happens if extra production capacity only can be added in large steps, as it creates short-term over-capacity on the market, which could cause a price war.
- High exit barriers, as these markets are difficult to leave due to costs of closure or disinvestment. This forces competitors to price competition to keep their market shares in declining industries. The reason for exit barriers to be high could be high investment in particular assets, such as equipment that cannot be sold.

- Low differentiation, as there is little reason for customers not to choose the lowest available price if there are no other advantages with a different offer. If there is no way of differentiating, then the only way of competing will be through price.

Aside from these, all the previous four forces will affect the competitive rivalry between organisations in a market. The more competition there is in an industry, the worse the situation for the organisations operating there will be.

3.5 MANUFACTURING NETWORK STRATEGY DEVELOPMENT AND ANALYSIS

The model brings forward a network theory-based model for the development and analysis of manufacturing strategies. It is based on the concept of horizontal and vertical technologies. As explained in the initial chapter of this report, the horizontal technologies are the function of a product, and describe the performance characteristics while the vertical technologies are the pure technologies following technology disciplines. Horizontal and vertical technologies can be used as a framework for describing the intricate process and product systems that arise in global production systems. The network model framework describes the actors, resources and activities, and how these are related. This brings forward the important issues to consider and decide upon. The actors are the involved parties and could be both individuals and organisations. They are in possession of the resources and control the resources; they also perform, and have knowledge about the activities. Activities include both transactions and transformations and can change or exchange the resources. Lastly, the resources can be human, physical or just financial. The network that is built by these form a hierarchy with the original equipment manufacturer as the top, resting on a foundation of supplier tiers, where each level becomes more and more specialised on a smaller and smaller sub-system or component of the finished product.

The networks model represents a perspective that gives the ability to identify the dimensions of future manufacturing. As organisations are more often organising in ways that require more external activities, the managing operations covers more actions and issues including external networks. In order to analyse the nature of boundaries of an organisation, one should focus on the linkages among the organisations that interact to develop, design, and manufacture products that includes multiple technologies. Organisations are then seen as integrators of information and knowledge, which should be sourced both internally and externally. Thus networks give the possibility of drawing benefit from the advantages of both integration and specialisation. This is what Karlsson and Sköld refer to as the shift from an enterprise to an *extraprise*. The manufacturing network context is illustrated below.

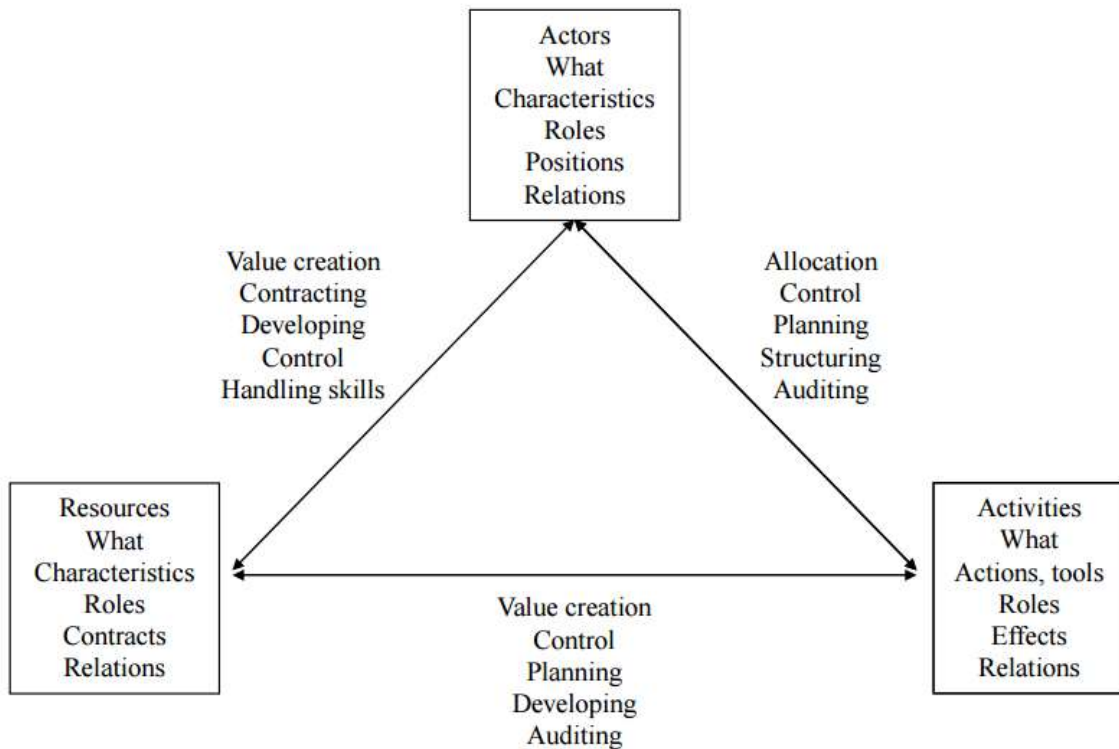


Fig. 4 Karlsson and Sköld's manufacturing network context¹⁸

The idea of the model is that managers should not focus on managing their own organisational unit, but focus on managing a network of business units. Performance should not be evaluated by the productivity or the efficiency of the single organisational unit, but instead on the ability to continue to develop, design and manage the various manufacturing networks that are intended to contribute to the businesses of the controlling company. The framework should inspire into many questions to ask when formulating manufacturing strategy in a network perspective, and a list of generic example questions are included below.¹⁹

¹⁸ Karlsson, Christer and Sköld, Martin. The manufacturing extraprise: an emerging production network paradigm. *Journal of Manufacturing Technology Management*. Vol. 18. No. 8. 2007. P.928

¹⁹ Karlsson, Christer and Sköld, Martin. The manufacturing extraprise: an emerging production network paradigm. *Journal of Manufacturing Technology Management*. Vol. 18. No. 8. 2007. P.912-932

Manufacturing context

Markets

Segments
Competitive positioning
Differentiation
Pricing
Product portfolio
Etcetera

Network nodes

Actors
Which are they?
What characterizes them?
Which roles do they play?
Which positions do they have in the network?
Strengths and risks?
What are the relations between them?
How is value created?

Resources

Which are they?
What characterizes them?
Which roles do they play?
How do they contribute?
How are they chosen?
How are they evaluated?
How are they contracted?
How strong are ties?
What are the relations between them?

Activities

Which are they?
Of what kind are the actions?
What value do they create and contribute?
What managerial measures are taken?
Which roles do activities play? Purposes and aims?
Which effects do they have in the network?
What are the relations between them?
Combinatory effects?

Resources

Human
Physical
Financial
Know-how
Location
Etcetera

Network relations

Actors – Resources
How are resources chosen?
How are resources allocated?
How are values created?
How are resources contracted?
How strong are different kinds of ties?
How are resources developed?
How are resources controlled?
How are resources handled?

Actors – activities

What value creation activities are chosen?
How do activities perform?
How are activities allocated?
How are activities organized?
How are activities controlled?
What managerial tools are used?
How are activities planned?
How are activities structured?
How are activities audited?

Activities – resources

How are values created?
What are the investments in resources?
What are the costs of resource utilization?
How are resources controlled?
How are resources planned?
How are resources developed?
How are resources audited?
How do activities influence resources?
How do resources influence activities?

Fig. 5 Karlsson and Sköld's manufacturing context checklist²⁰

²⁰ Karlsson, Christer and Sköld, Martin. The manufacturing extrapraxis: an emerging production network paradigm. *Journal of Manufacturing Technology Management*. Vol. 18. No. 8. 2007. P.929

4. EMPIRICAL DATA

4.1 CONSIDERED MARKETS

This section will present the explored options for possible markets to launch Alfdex's new product on. The product function is to separate solid particles from air through Alfdex's patented separation technology. The search was conducted in three steps, each broadening the scope of possibilities.

Firstly, Alfdex current customer were considered, looking at how they currently separate solid particles from air, which is mostly done through cellulose filtering, and what possible applications Alfdex's solution could replace.

Secondly, other markets where solid particles are currently being separated from air are explored. This is also mostly done through a cellulose filter. It is important here to look for applications where Alfdex's solution could be a possible replacement.

Lastly, the scope was widened to any possible situation where solid particles could be separated from air through Alfdex's solution, but where no filtration at all is currently being done.

Throughout the search, alternatives that were without doubt either practically impossible or where it was apparent that there would not be any profit generated was discarded directly. The following mentioned are those that were taken under serious consideration during the analysis.

4.1.1 CURRENT CUSTOMERS

Looking at Alfdex's current two self-defined customer segments; *On highway* and *Off highway*. Where *On highway* includes manufacturers of trucks, medium-duty and heavy buses.²¹ While *Off highway* are manufacturers of products for all other markets: tractors, forestry equipment, generators, boats, combine harvesters, military vehicles, locomotives and construction vehicles, which all use diesel engines.²² A complete list of Alfdex customers can be found in Appendix A.

Specifically looking at possible filters that these customers currently use that could be replaced by an Alfdex solution separating air and solid particles the following are found:

²¹ Alfdex AB. 2016. *On highway*. <http://www.alfdex.com/customer-solutions/on-highway> (retrieved 2016-10-18).

²² Alfdex AB. 2016. *Where to put it*. <http://www.alfdex.com/customer-solutions/where-to-put-it> (retrieved 2016-10-18).

4.1.1.1 INTAKE AIR FILTER

This market includes all intake air filters used in motorised vehicles, but with a focus on current customers the most interesting segment is medium- and heavy duty trucks. The intake air filter protects the engine from contaminations in the outside air. Depending operating conditions some applications include in addition to the primary air filter, both a pre-cleaner that whirls away the largest contaminations and a secondary air filter inside the primary air filter that only has to be changed every 3rd to 5th time that you change the primary air filter. The most harmful parts for the engine are those that are between 5 and 20 micrometres, which need to be almost entirely filtered out.

4.1.1.2 CABIN FILTER

Many motorised vehicles also have a cabin filter that filters the air coming into wherever the driver is seated. The cabin filter mainly protects the driver from hazardous working conditions, but also the AC unit and the heater core. The cabin filter can be made out of several different media e.g. standard air filter cellulose, activated carbon to reduce bad smell (such as at a dump) or specialised media for asbestos protection used at demolition sites, it depends on where it is intended to be used.

4.1.1.3 BREATHER FILTER

The breather filter protects components that need to draw in and push out air, hence the name. Breather filters prevent particles from the surroundings from entering the hydraulic system. The intake of particles in the hydraulic system is due to the fluctuations of the oil level in the tank. Some breathing filters applications are also required to keep out condensation in the air or liquids (water) in addition to solid particles, depending on what the hydraulic tank is used for.²³

4.1.2 OTHER CURRENT FILTER APPLICATIONS

There are numerous different other filter applications, where a filter is used to separate air and solid particles which should be considered for Alfdex's new product. These applications are all possible new market segments with new customers for Alfdex.²⁴ The list of applications was retrieved through Swedish filter wholesaler Fleet Tec, and their general filter education. They cover all general modern usages of filtering, and would be sufficient for Alfdex's intention of finding broad profitable markets.

²³ Fleet Tec. 2016. *Filterutbildning*. <http://www.allafilter.se/index.cfm?pg=34> (retrieved 2016-10-20).

²⁴ Filtertechnik Sverige AB. 2016. *I väntan på universalfiltret*. http://www.filtertechnik.se/katalog/filtertechnik_broschyr_lagupplost_id796.pdf (retrieved 2016-10-20).

4.1.2.1 VACUUM PUMP FILTER

Vacuum pumps have a wide variety of applications, which many use a filter for air intake. These can have very different sizes, exhaust flow rates and particle removal depending on application.²⁵

4.1.2.2 COMPRESSED AIR FILTER

Compressed air filters are used to remove particles from compressed air after it has been compressed. These filters remove both solid particles such as dust, or liquids such as water or oil.²⁶

4.1.2.3 POWDER COATING FILTER

When powder coating a cartridge filter is used to filter the air intake to remove any unwanted particles from the air. Filter replacement can be one of the largest operating expenses for powder coating.²⁷

4.1.2.4 THERMAL SPRAY FILTER

Larger thermal spraying operations often include a dust collection system. A part of this system is a filter removing the dust from the air that is working with a fan that creates airflow. Some parts of the dust can be combustible.²⁸ Thermal spraying can generate extremely small particulate called “fume”, and this thermally generated fume can be even smaller than 1 micron in diameter.²⁹

4.1.2.5 SILO VENTING FILTER

Many silos use a venting filter to keep the dust inside the silo as air travels out of the silo when the silo is filled with the desired substance.³⁰

²⁵ Walker Filtration LTD. 2016. <http://www.walkerfiltration.com/products/filters/vacuum-pump-protection-filter/15> (retrieved 2016-10-20).

²⁶ Parker Hannifin AB. 2016. *Compressed air filters*.

[https://www.parker.com/literature/Balston%20Filter/IND/IND%20Technical%20Articles/PDFs/Compressed Air Filter Installation Recommendations.pdf](https://www.parker.com/literature/Balston%20Filter/IND/IND%20Technical%20Articles/PDFs/Compressed%20Air%20Filter%20Installation%20Recommendations.pdf) (retrieved 2016-10-20).

²⁷ Materials Today. 2010. *Selecting Cartridge Filters for Powder Coating Operations*. Walz, John. <http://www.materialstoday.com/powder-applications/features/selecting-cartridge-filters-for-powder-coating/> (retrieved 2016-10-20).

²⁸ Donaldson Torit DCE. 2016. *Efficient Control of Thermal Spray Dust Collectors*. Richard, Paul. <http://www2.donaldson.com/torit/en-us/pages/technicalinformation/efficientcontrolthermalspray.aspx> (retrieved 2016-10-20).

²⁹ Donaldson Torit DCE. 2016. *Thermal Spray Coating Process*. <http://www2.donaldson.com/torit/en-us/pages/applications/thermalspray.aspx> (retrieved 2016-10-20).

³⁰ Silokonsult AB. 2016. *Silo Venting Filters*. http://silokonsult.se/files/60_silotop_0708_sk.pdf (retrieved 2016-10-21).

4.1.2.6 WELDING FUME FILTER

Welding produces toxic fumes that need to be extracted by a filter. The fumes are filtered from above the working area either through a hood or an extension arm³¹. The filtered air is then either routed back to the working area or pipelined outdoors.³²

4.1.2.7 DUST OR PARTICLE EXTRACTION

Many other industrial processes generate contamination in the form of dust and particles. General handling of textiles, wood and composite, or various processes such as cutting, grinding, sanding, or the general handling of powder in food, and pharmaceutical industries can release these types of fibres. These particles are often collected through a hood or an extension arm, or when in larger quantities a form of dust collector.³³

4.1.3 UNEXPLORED MARKETS

These are possible applications where there is no current filtration being done, but either Alfdex's solution opens up new possibilities or future legislation will require some filtration to be done. The possibilities here are of course infinite, but most would have no apparent profitability or only be relevant in a far too distant future. Even the one recognised application is considered barely plausible by the author, but was taken into account during the analysis to make sure that a broad enough base of alternatives were considered.

4.1.3.1 AIR CLEANING

Using 26 different global atmospheric chemistry models to predict the global atmospheric environment between 2000 and 2030 one can conclude that enforcing current air quality legislation and using currently feasible technologies would significantly improve the overall air quality.³⁴ The main focus for the European Union's clean air directive is the levels of fine particles and ozone³⁵, meaning that very small particles will have to be separated from the air in order for Alfdex's product to be of any use in this way.

³¹ ESTA Apparatebau GmbH & Co. 2016. *ESTA Extraction Arms*. <http://www.esta.com/en/products/extraction-arms/> (retrieved 2016-10-21).

³² ESTA Apparatebau GmbH & Co. 2016. *Welding Fume Extractors*. <http://www.esta.com/en/products/welding-fume-filters/> (retrieved 2016-10-21).

³³ Nederman Holding AB. 2016. *Extraction of Dust and Particles*. <http://www.nederman.com/problems-we-solve/extraction-and-filtration/dust-and-particles> (retrieved 2016-10-21).

³⁴ Dentener et al. The Global Atmospheric Environment for the Next Generation. *Environmental Science & Technology*. Vol 40, No. 11, (2006): 3586-3594

³⁵ European Commission. Environment Air Policies. 2016. http://ec.europa.eu/environment/air/index_en.htm (retrieved 2016-10-18)

4.2 CURRENT CUSTOMER INTERVIEW

In order to understand the customer needs for this project, current Alfdex customers were asked to participate in an interview regarding Alfdex's new product idea. The author conducted the interview together with the responsible for the prototyping of Alfdex's new product and the Alfdex Product Development Engineer.

The interviewees were initially presented with a short background of this Alfdex project through a PowerPoint-slide that read as follows:

“Removing dry particles from gas

Background

Alfdex is presently the market leader in high efficient solutions for removing particles from crankcase gases.

In order to expand our businesses to new markets Alfdex aim to explore the possibility to adapt our technology to remove dry particles from gas. With a product which can remove dry particles there is a broad potential market of filter applications to compete with.

Our present crankcase gas separator removes wet particles from gas and there are many technical difficulties to solve to enable our disc technology to handle dry particles. One foreseen major problem is to keep a separated dry particle from re-entering the gas flow.”³⁶

The interview then followed with two separate topics: firstly, technical information and lastly, market information. The author was responsible for the second part, which considered market information. There were a number of prepared questions for both topics, but they were not strictly followed and the interviewees were given time to elaborate their answers and to answer possible follow-up questions, hence it was conducted as an unstructured interview with just topics to discuss. The questions and following discussions were all in Swedish as this was the native language for all involved and only the answers relevant for this project will be presented as many of the technical discussions have no significance in a market perspective. All slides from the PowerPoint.-presentation used for the interview can be found in Appendix B.

Three different professionals agreed to answer the interview. They work at the same large automotive company who is currently a customer to Alfdex, implementing their crankcase gas separator into their products. Though they worked for the same

³⁶ Customer Interview, Appendix B

organisation, they could all three contribute with a unique perspective as they have different roles within their organisation. Their official titles were as follows:

1. Buyer at Base Engine & Moving Parts
2. Supplier Quality Assurance – Fluid Management
3. Global Filter System Responsible

4.2.1 INTERVIEW FINDINGS

The purchasing process at this large automotive manufacturer has four different branches. They specialise in: aftermarket, operations, project and sourcing. Sourcing is the relevant branch for a first contact with a possible supplier and to take in new technology.

Introducing a new part to the company is a long process. The company works with a system that determines the every new suggested part's Technical readiness on a scale of 1 to 9. A higher number means more ready and a Technical readiness of 9 means that it is in production and hence the purchasing is then done through operations purchasing. A Technical readiness of at least 6 is required for a project to move from sourcing to project purchasing. Though a specific time frame for this process cannot be generalised, it is possible to say that it will take more than 2 years, and 5-15 years is a fair estimation, and that is the time from a technically ready status to actual application in serial production.

However, Technical readiness is obviously not the only requirement as not all technically ready products are implemented. Technical innovation must also fit into the design concepts of the manufacturer. There is an idea behind the concept that the finished product must keep, and there are different trends that can be seen in the business. Therefore internal marketing is important in these large organisations, and for suppliers to convince important decision-makers that their solution is the right way to go.

The professionals agreed that innovation within the filtration business has been incremental for a very long time and that the current trends in the industry are focused on other things. There is a lot of focus on *connectedness* and wireless communication in the industry right now and for the past few years. There is however very little happening on what is considered to be mature chassis parts, such as the filter in this case. Though solutions similar to the Alfdex one had been seen in the industry before, such as wet cyclone and filter combinations for extreme conditions.

Becoming a supplier to such a large organisation as the automotive manufacturer is not an easy task. It is a business where *price* is very important and often then only way to compete as many parts are considered commodities. It is also important to not have

any *quality problems* as it is vital that suppliers can be trusted to deliver in time to keep production pace up, and quality is also a very important factors when choosing product for the end consumer. There is therefore a considerable amount of time spent on evaluating and authorising new suppliers, and a company-wide policy of keeping the amount of suppliers to a minimum. They do however still work with component suppliers and not system suppliers as price and quality are such important factors for every single component. It is here a great advantage for Alfdex to already be a supplier of other parts, as the authorisation process can be such an obstacle to overcome for new organisations seeking to sell their innovation to automotive manufacturers. But Alfdex would still have to keep a competitive price and good quality on their products as each component is evaluated by itself.

Looking at the actual benefits of the Alfdex solution, the cost of down-time is a very important factor in the industry and it is only getting more and more important. There is an active goal for the automotive manufacturer to increase up-time. Trucks do have to get serviced every so often; usually there is about a 2 years interval between each service. Unplanned services are considered a catastrophe and a major cost, and are much prioritised to be avoided as much as possible. The main reason for the planned services is often oils, and the bottleneck is thus not the air filter. It is very rare that a filter would cause an unplanned service as well. Hence a longer economic lifetime for the air filter (which the Alfdex product would replace) would not mean more up-time or less frequent services. A new filter is a very small cost when servicing a truck and the replacement takes just about 15 minutes, though of course this is not something that you would like to do too often.

The aftermarket is also an important factor for the automotive manufacturer. If they were to make the switch from filter to Alfdex solution, the lost income from aftermarket filters would have to be compensated through some kind of added value for the customer.

5. ANALYSIS

Creating a new innovation but not entirely knowing what it could be used for is a common case in many industries. The innovation in the Alfdex case is a modified version of the current product that is based on the same separator technology. Alfdex wants to use their current vertical technology of the separator to create new horizontal technologies. This could be considered as product development in the Ansoff matrix, but as the intention of Alfdex is mainly to reach new user markets, it should be treated as market development with some product development necessary to adapt to new markets. In order for market development to be conducted in a successful manner, Ansoff states that it is important to know the critical success factors of the new markets and make sure that the product fulfil these. The needs of the new user market will not be the same as those on Alfdex's home market, thus a good start to find suitable markets is to examine what needs that their horizontal technology can fulfil.

After assessing the needs, further criteria would be required in order to continue the evaluation. But these could not be chosen at the start of the project as it was not clear which way the prototype would be designed. Though as the prototype was constructed, the characteristics of the prototype and the expertise of the Product Development Engineer could assist in evaluating in which of the identified markets would be feasible for Alfdex's new product. The last part of this funnelling process would then be to determine the most attractive of all the feasible markets by considering the possible profitability for Alfdex. Profitability was here considered using both limits set up by Alfdex themselves and the use of relevant theory.

5.1 NEEDS

The new product separates solid particles from gas, which is different from the current product that separates oil and soot from gas, intended for cleaning crankcase gases, though it is based on the same vertical technologies. The ability to also remove solid particles from gas opens up a wide range of new possibilities as the need to separate solid particles from gas is common in a number of fields. This need is most commonly solved through different kinds of filters, using a membrane or layer of cellulose or similar to separate particles from flowing air. The filter is a vertical technology that has become market standard and a commodity in many markets. Though solutions similar to the Alfdex, where a separator is used instead of a membrane are used in certain cases as stated by interviewees with expertise in the field. Therefore in order to identify needs that Alfdex's new product could satisfy, a wide variety of filter markets were suggested in order to provide as complete a picture as possible of the filter market. As stated in the Empirical data section, the search for markets was conducted in three steps, starting with current customers' filter needs, then looking at other filter applications. Lastly as an insight into the filter industry was achieved, possible future

filter applications were predicted in order to find possible needs that were not yet fulfilled by any competitor.

Even though all the identified markets are plausible, going into depth on all of those markets cannot be done within the time constraints of this thesis and would not be the most effective way of working. The agile work method helped to set up further criteria to easily narrow down the number of applications to evaluate by discussing with the responsible of the prototyping team and Alfdex's Product Manager. These are intended to narrow down the amount of areas to investigate, by looking at different aspects that would either give apparent advantages to Alfdex penetrating that market or that characteristics of the supposed product are as similar as possible to Alfdex's current product and prototype. Hence the criteria feasibility and profitability were decided to be decisive in the process of eliminating certain markets.

5.2 FEASIBILITY

In order for a market to be serviceable by Alfdex new product, the product has to be fully operational and satisfy the customer needs on the market. These limitations are based on the prototype and the known limitations of the current product, and thus the used separator technology. These factors will have to be taken into account when evaluating the possibility of Alfdex to launch on a specific market, as these will hinder Alfdex from being able to compete at all as the market needs cannot be fulfilled.

5.2.1 PRESSURE

Performance of Alfdex's current product varies greatly with the amount of pressure it is under. Implementation into systems operating under pressure as close as possible to Alfdex's current products operating conditions is preferred as performance is more likely to be adequate for the prototype, as the prototype builds on the same separator technology as the current product. Hence the application should not be pressurised and operate under normal atmospheric pressure in order to be ideal for Alfdex's new product as this will be the conditions the prototype is intended for. As Porter states both in his competitive strategy of cost-leadership and in his five forces as a threat of entry experience is very important for an organisation to keep costs down and to fend off new competition. By sticking to non-pressurised applications Alfdex will be able to draw more advantage of their experience as non-pressurised is the situation they are used to. It is possible that the Alfdex design is not ideal for pressurised applications as it has been developed and refined to reach maximum efficiency at normal atmospheric pressure. Hence it would be ideal for Alfdex to find an application for their new product in a field that is as similar to their current fields as possible in order to draw full use of the experience they have as a company.

5.2.2 AIR FLOW

In order for Alfdex's product to work there has to be an air flow through the separator. The air flow cannot be too small or too large, as this will reduce the performance of the separation, which is normally not the case of a cellulose filter. The current Alfdex product separates 200-400 litres of air per minute which is ideal for the current use in crankcase gas ventilation. The prototype however, will be operating closer to 20'000 litres of air per minute for ideal performance using the same separator technology. The decision was based on maximising performance and the average air flow in the trucking industry presented by the interviewees from the automotive manufacturer to the responsible for the prototyping. The intended markets should therefore ideally be close to these figures to make sure the product will have sufficient functionality.

5.3 PROFITABILITY

Just as the product has to fit the market needs, the market has to fit Alfdex. As most organisations, Alfdex is trying to maximise profitability. Porter's five forcers describes the factors making an industry attractive to compete on, which is the same as saying there is higher profitability in these industries as the rules of competing are not as harsh for the competitors. Obviously all the current filter markets are profitable to some degree as there are organisations competing on them using the same vertical technologies of filters. As Alfdex would enter a new market with their new product, aspects that would give Alfdex an advantage in establishing themselves on that market by using current strengths were focused on.

5.3.1 CURRENT BUSINESS RELATIONS

As stated by Kotler's business buyer behaviour the buyers are usually few and powerful in business to business markets, hence it is a great advantage to have established relationships with these buyers on other markets that they operate on. As the interviewees from the large automotive manufacturer explained, becoming a supplier to a large company takes time, as there is a process to be deemed reliable and ethically acceptable. As Alfdex is already an approved supplier in their home market of crankcase cleaning, it would be easier for them to become suppliers for the automotive manufacturer's other needs. This would be an entrance barrier for competitors and would give Alfdex a competitive advantage if they chose to move into these markets. Current relations on other markets also give an insight into the quality standard of the customer, even if the new product would be intended for an entirely new branch of the customer company. In other words, it would be possible to utilise the current experience with the customer to a competitive advantage, thus bypassing an entrance barrier that other new competitors must undertake. However, as illustrated by Kotler in his model of business buyer behaviour there is a difference between the buying organisation and the buying centre. Thus current business relations with the

organisation would give an insight into the organisational influences of the organisation, but still the interpersonal and individual influences of the new branch that would handle the buying decision process for the new product would be unknown to Alfdex.

5.3.2 VOLUMES

Alfdex have the experience of working in a business to business environment, and selling large quantities to few customers. In order to utilise this expertise and that they already have infrastructure and production line that is necessary to handle large orders, typical business to business markets should be targeted. These markets have few powerful buyers, which Porter brings forward as an aspect that lowers the attractiveness of the market. Alfdex have experience working in a business environment with few powerful buyers, which gives them competitive advantage in similar markets, as they have experience working under these conditions. The extra effort that would have to be put into changing the business model for Alfdex in order to match a business to customer environment would lead to a lot of unused expertise in the organisation, as there is so much experience within the organisation working with their current model.

The intended market as a whole also needs to be large enough for Alfdex to make noticeable profit. Research and development of a new product with the Alfdex separator technology, and adapting product lines or adding production capacity is costly and time consuming. Business buyers are also often mindful of their brand, and as the interviewees explained, the process of becoming a supplier to a large organisation can take a long time and introducing a fully new product can take even longer. Thus the expected lifetime of the product income has to exceed all the development cost and time taken in order for Alfdex to consider moving into that market.

5.4 EVALUATION

The evaluation is briefly summarised in figure 6 to provide an overview of the main aspects of the evaluation. The different pieces are more thoroughly explained in the following sub-chapters.

Needs	Feasibility	Profitability
Separation of solid particles and gas	Normal atmospheric pressure	Current customer's other filter needs
	Constant moderate air flow	Large enough markets for sufficient volumes

Fig.6 Summary of evaluation aspects

5.4.1 NEEDS

All of the market segments presented in the *considered markets* segment are identified by finding needs that the new Alfdex solution would satisfy. The choice to find markets in a three step process, starting with current customers, then other filter applications and lastly unexplored markets was done in order to as efficiently as possible find possible markets. As starting with current customers gave a narrow field to search in, it gave a basic understanding of filtering industries and the searching process, which made it easier to find other filter applications. Lastly an understanding regarding where filter needs occur was reached and possible future markets could be predicted. Thus the aspect of what needs that a product separating solid particles from air could fulfil, gave a broad variety of markets to start evaluating further.

5.4.2 FEASIBILITY

The first elimination of markets could be done by identifying the market that Alfdex's new product could not compete on as the separator technology would not be able to sufficiently remove the solid particles from the gas. These markets were identified by looking at the areas of pressure and air flow described above.

Breather filters "breathe" as a low pressure area is created by engine vacuum occurs, vacuum pump filters are used in pumps removing gas molecules from a closed area to create a partial vacuum, and thermal spray filters create a partial vacuum to draw in air. They have in common that they all operate in an environment with a pressure lower than the normal atmospheric pressure, which means that the air flow will be too small for the Alfdex separator technology to adequately separate the particles from the air. On the opposite side of the spectrum the compressed air filters remove contaminants from compressed air, Silo venting filters operate on pneumatically filled silos. These applications have pressure higher than normal atmospheric pressure and thus the air flow will be too high for the Alfdex separator technology to be operational, as particles will slide through. In order for the prototype to be functional on the market with the use of the current separator technology, the above markets should not

be focused, as the product will not be able to successfully keep an acceptable level of separation.

Looking at physical design features of Alfdex's new product and generalising the design of the considered markets, the prototyping is similar to the current product; a cylindrical shape with rotating discs inside. The shape and size resembles that of an intake air filter, as the design is inspired by that. This design could also work well in a hood-shaped compartment placed above the working area, such as the case in some welding fume filters, or dust or particle extraction, or in a separate filter booth as in some other welding fume filters, or powder coating filters. The cylindrical shape design works well for these applications and would not require much redesigning of the intended area. Cabin filters however are currently in the form of flat, square-shaped rectangular boxes, which would have to redesign either the available compartment or the Alfdex prototype in order to use it for that purpose. As there is no current product available for air cleaning, there is no current design to replace, and the application could thus be shaped after the Alfdex prototype.

5.4.3 PROFITABILITY

In considering what market that Alfdex can leverage the most competitive advantage the current customer markets of Intake air filter and cabin filter are perhaps the most interesting ones. As these are applications that Alfdex's current customers could benefit from, Alfdex can benefit from their experience and their current business relations. An established relation in these mature industries, where becoming a supplier is time-consuming and there is an active consensus of reducing the amount of suppliers according to interview findings, is an advantage. However it is important to know that the large automotive manufacturers are big organisations with several different departments. As seen in the Business buyer behaviour-model, the buying organisation has organisational influences that Alfdex are already aware of. This could be quality standards and supplier requirements that are the same throughout several different departments. Efforts still has to be made to influence the buying centre for the new product, to convince them to choose the new Alfdex product over their current filter solution. The new buying decision process is not familiar to Alfdex and involves separate staff and new interpersonal and individual influences. It is likely to believe that the intake air filter buying process is more similar to the buying process of Alfdex's current product than what the cabin filter buying process is. This as the department responsible for the engine parts, and thus the intake air filter is closer related to Alfdex's current crankcase gas cleaning than what the cabin filter's department is.

Looking at the other markets, they are similar in structure to the automotive manufacturer market that Alfdex currently operates in. The industries for powder coating filters, Welding fume filters and dust or particle extraction mostly follow the

Kotler's business buyer behaviour model, with fewer large buyers as expected in business to business environment. The transition to this type of industries would be smaller than to move into business to consumer industries, but lots of experience and current business relations would be unused by focusing on entirely new industries instead of focusing on current customers.

Air cleaning is perhaps the most difficult area to assess the profitability in, as there is no current market for it. If legislation changes would come and the industry would start to look for suppliers Alfdex could be a candidate to use their separation technology experience if it would be operating under such conditions that sufficient air cleaning could be reached. However currently there is little incentive for other organisations to take this type of air cleaning upon themselves, and it is perhaps an idea to keep for future consideration as there is future potential, as the legislation is moving in that direction but is not there yet.

6. CONCLUSIONS AND RECOMMENDATION

6.1 ATTRACTIVE MARKETS FOR ALFDEX

As expected, there is a reason that the suggested intake air filtering was the first market to come to mind in the *Out-of-the-box* competition that Alfdex held themselves, as it is so closely related to their current business. This could be a lucrative market for Alfdex as they can take advantage of many of their current strengths. Their current buyers of their crankcase gas cleaner in the automotive manufacturer industry could be interested in the new application as well, as the process of becoming a supplier can be a large entrance barrier for new competitors. Also the experience of working with these buyers can mean reduced costs according to Kotler's theory of business buyer behaviour. These conclusions however assume that the Alfdex product is on all non-mentioned accounts working exactly as the current market alternative. If the separator would be more expensive or consume more energy this would have to be compensated for by adding value to their customers. This information is valuable for the construction of the prototype as the current market alternatives can be used to benchmark price and energy consumption.

However, the conducted interviews indicate that there are some doubts on the benefits of Alfdex's new product for use as an intake air filter. Currently there is no performance improvement seen, as very close to all particles are already removed. The economic lifetime of Alfdex's product is expected to surpass the economic lifetime of a truck, but the filter is not a bottleneck for expected service intervals or a large expensive item in a truck service. Replacement filters are however a valued aftermarket product for automotive manufacturers, for which they would have to see technical improvements to disregard. Hence Alfdex's new product could perhaps be designed to fit into the current filter socket, and launched as an aftermarket product, as the end user would perhaps see more benefit of not having to change filter during services than the automotive manufacturer. This would however require relationships with current automotive retailers, as selling directly to end users would mean a major change in Alfdex's business model.

Cabin filters could also be a possible market for expansion, but is not as advisable as intake air filtration. The benefit of using the same buyers are still there, but not as closely related to their current field of business as the intake air filter. The design however will be a problem, as it would require redesigning the new product or the intended compartment for the filter, a change which would require more effort and thus the benefits of the Alfdex solution has to be greater in order to convince the new buying centre.

The conclusions regarding the automotive manufacturer's filter markets are however based on very few interviews of professionals working at the same company, so there is little guarantee that this is the general opinion of the market, and more extensive market research should be conducted to increase the validity of the research.

The other industries deemed feasible for Alfdex's new product, powder coating filter, welding fume filter, and dust or particle extraction, also have the potential for future expansion. However these are further into the area of conglomerate expansion in the Ansoff matrix, as the markets are further away from Alfdex's home market. These applications should perhaps be reconsidered after Alfdex has done a successful launch of the separator for solid particles from air on a more familiar market, as these would then be a clear case of market development and the risk would be lower. Targeting these markets directly would require more resources and more risk involved than needed, and is therefore not advisable.

As there is no current market infrastructure for the air cleaning application it is difficult to evaluate. It is however easy to conclude that the market is not yet ready for the Alfdex product, but that legislation changes should be kept under observation as there is a potentially huge market if stricter emission rules would force the air to be cleaned. Air cleaning would then be a great business opportunity for Alfdex, and even more so if they already have successful solid particle from air cleaning being done on other markets as it would build relevant experience.

The industries that were deemed unfeasible due to pressure or air flow are breather filters, vacuum pump filters, thermal spray filters, compressed air filters, and silo venting filters. These would require radical changes to Alfdex's new product to be considered for expansion, as the current design is not able to fulfil the market needs of particle extraction. As this report does not go into technical details, the effort required to make these changes is unknown, but the current separator technology used by the new prototype is unfit for these applications.

All filter industry information is obtained through publications by industry organisations, mostly targeting their current customers. The industry might therefore seem more attractive than they are and the actual profitability of the markets and the success factors needed to compete requires more in-depth analysis of each of the markets.

6.2 FURTHER INVESTIGATIONS AND PROJECTS

The scope of this investigation was limited to Alfdex's new product with a special focus on their current customers. It could be interesting to see how other suppliers have introduced new products to these large manufacturing industries, to better understand how the selection process is conducted and what success factors for new product that

could be determined. Another aspect is if there is a general strategy to follow when introducing new products to one's buyers, and what difficulties that could emerge and how they are best handled. As this study is only on one specific case and based on very few interviewees, it is not possible to draw generalisations for how other cases would go about. Hence the reliability of the research could be tested and the validity strengthened through further interviews regarding this particular case, which would also increase the value of this Alfdex case research.

Concerning the Alfdex product there are a number of technical aspects that are not covered as the prototype was being developed during this investigation. Having access to all technical specifications, and thus being able to evaluate strengths and weaknesses in application would give another dimension to evaluating the applicability of the Alfdex product onto new markets. Instead of assuming similar functionality, evaluation based on performance could be carried out.

Market research could be broadened to give some general applicability to the results, and would have increased the contribution to science as there is little data to find regarding the filtration industry as a whole. The interviews that were conducted could provide a framework for surveying other market actors to conclude if the interviewees' picture of the industry is as general as assumed throughout this paper.

6.3 CONTRIBUTION TO SCIENCE

As there is little empirical research to find in the academia on the filtration industry, the concise presentations of this paper does not suffice to make a general picture of the industry, it could well suffice as a foundation for a further mapping of the industry.

The research process could be of value for future research, as the funnelling process to effectively narrow down the number of alternative markets and then evaluating the remaining alternatives could be replicated in many variations in other studies. Although not the first study to be conducted in this manner it serves as a relevant and current example of the working process.

The theoretical model combination and application that is a result of the literature research is a contribution to the theory within this area, but would require further examples to institute general applicability. The model of funnelling possible new markets through Needs, Feasibility and Profitability, that is the result of this project are generic and could with verification be applied in other cases of new product introduction. The model ensures that the product will have a place on the market, that the product can be produced by the investigating organisation and that the application with most positive synergies with the current product portfolio is selected. The model will thus recommend the market that provides the most value-added.

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APPENDICES

A – ALFDEX CUSTOMERS

Mercedes-Benz

Freightliner

FUSO

Western Star

Setra

Volvo

Renault Trucks

Mack

UD Trucks

Scania

Kenworth

Peterbilt

Caterpillar

International Trucks

IC Bus

MAN Truck & Bus

John Deere

AGCO Power

Volvo Penta

Volvo Construction Equipment

Navistar Defense

B – CUSTOMER INTERVIEW



Agenda



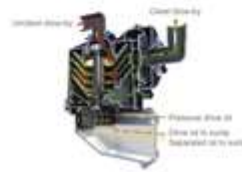
- Presentation av examensuppgift
 - Teknikfrågor
 - Marknadsfrågor
- Mats-Örjan Pogén
Pascal Simon
Eddie Andersson

Background

Alfdex is presently the market leader in high efficient solutions for removing particles from crankcase gases.

In order to expand our businesses to new markets Alfdex aim to explore the possibility to adapt our technology to remove dry particles from gas. With a product which can remove dry particles there is a broad potential market of filter applications to compete with.

Our present crankcase gas separator removes wet particles from gas and there are many technical difficulties to solve to enable our disc technology to handle dry particles. One foreseen major problem is to keep a separated dry particle from re-entering the gas flow.



Teknik

Aerosol:

Vilken är minsta partikelstorlek som måste filtreras bort?

Hur stor måste reningsgraden för varje partikelstorlek vara?

Har ni en lognormal fördelning för aerosolen före/efter luftfilter?

Vilka partiklar ställer till mest problem? Var ställer till det med problem?

Motor:

Vad är luftflödet i motorn? Min och max?

Hur stort är undertrycket som motorerna orsakar utan filter? (För CFD analys)

Hur stor är tryckförlusten orsakad av filtret? Ny, max, service.

Hur stort värde har ett minskat tryckfall?

Hur tar ni in nya komponenter?

- På vilket sätt skiljer sig processen för att ersätta existerande komponenttyp mot att aktivt söka efter radikalt ny typ?
- Hur lång ledtid kan det vara innan en helt ny komponent kan placeras i serieproducerad bil från det att idén tas in?

Hur prioriterat är innovation gällande standarddelar, såsom insugs-/hyttfilter?

- Är dessa alltid en del av ett system/delsystem, som köps i sin helhet från underleverantör?

Hur väljer ni era underleverantörer?

- Är det en fördel att ha samma leverantör till flera olika delar?

Vilka produktattribut är viktiga för ert val utav insugs-/hyttfilter?

- Hur viktiga är framförallt ekonomisk livstid och stilleståndskostnad i jämförelse med pris?
 - Hur starkt är ert systemtänkande?
- Finns applikationer med avsevärt större servicebehov?
- Finns applikationer med avsevärt större reningsbehov?

Befintlig lösning;

- Hur långa serviceintervall har filter?
- Vad är kundens kostnad för ett filterbyte?
- Hur värderar Volvo eftermarknaden inom filter?

