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How a market intelligence system can add value to the decision making process of NPD and sales
a design science approach

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How a market intelligence system can
add value to the decision making process
of NPD and Sales: A design science
approach

by

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Preface

This report is the result of my graduation project at Company X. This project marks the end of my master in Innovation Management at the TU/e.

This internship gave me the opportunity to combine the knowledge that I acquired during my master and apply it to the field of market orientation within Company X. I would like to thank my company supervisors for their support, advice and the opportunity they gave me to conduct my master thesis project at Company X. Moreover, I would like to thank my university supervisors Ed Nijssen and Isabelle Reymen for their usefull comments and advice during my graduation project. It really helped me in creating this report as it currently lies before you and they helped me in case a correction to the process was needed. Especially their knowledge about qualitative analysis and structuring of a report were of great help to me.

This master thesis project gave me a lot of experience in dealing with the many factors that are unavoidably connected with a normal organizational problem and how to deal with those problems. I hope the reader of this report finds as much joy in reading them as I had in working on this project and presenting these findings to you and I want to thank everyone again who made this possible.

Joost van Kesteren
Eindhoven, 8 October 2012

Management summary

Over the years, becoming market oriented has been one of the greater challenges companies are dealing with. Several studies have shown that market orientation (MO) has both a direct and indirect effect on organizational performance. However, eventhough the literature around this subject is increasing, the question of many companies how to implement such a MO whithin their company, from a process oriented perspective, has remained unanswered. Two streams of MO implementation have been identified being the cultural side and process oriented side. Whereas the former focusses mainly on changing values and believes that exist among all employees, the latter is concerned with changing processes and the current way of working. From the literature, some attemps have been identified that focus mainly on the change in cultural aspects that are unavoidably connected with the implementation of a MO. In order to fill this gap that was identified from the literature, the academic goal of the current study was stated as follow:

"Contribute to the current literature and develop knowledge in the field of MO implementation, through the use of CIMO logic."

One of the companies that is currently struggling with the implementation of a market orientation is Company X. They recognized the importance and added value that market intelligence can have on their daily business, and took the first initial steps into reaching their new goal. The main reason why market intelligence became important for Company X was clearly stated in the problem statement:

"The way in which external information gathering is done in the current situation is highly unsatisfactory due the high levels of inefficiency, leading to a lower rate of performance."

In order to see where the focus of market intelligence should be aimed at and thus what it's added value would be for the company, the research question focused at the current problem of Company X was stated as follow:

"How can market intelligence best add value to the decision making process of Company X?"

In order to find an answer to the research question triangulation was used for data collection. The main sources of data collection were twenty-five semi-structured interviews with internal employees. These individuals represented the stream of information of Sales towards new product development (NPD) within the company and represented the outline of this research project. Interviews were prepared using an interview framework and protocol, based upon Miles and Huberman (1994), and were mostly held face to face. These interviews were then recorded, typed out and coded to guarantee a certain quality of analysis within the research and replication logic within the study. Preparation for these interviews came in the form of studying documents & protocols related to the different groups in order to get familiar with their daily work and conducting a survey among the members to get an initial look into what could be expected of the interviews and which probes would most likely yield the best results. These different sources of data collection led to the within and cross case analysis.

Both the within case and the cross case analysis were performed to identify and validate the organizational problem further and see where there were still areas that needed to be worked on. The primary aim of the within case analysis was to determine the current gap that existed between the current and the ideal situation as was seen by the different decision makers. Based on the framework that was developed in the literature review (Van Kesteren, 2012), the size of this gap could be determined by three bottlenecks: missing information by the decision makers, problems in decision making, and knowledge transfer issues. During the within case analysis, several of these were identified in each group, after which the organizational problem was validated. In the cross case analysis, the objective was twofold. First, in order to find an answer to the research question, the results among the three groups in the within case analysis were compared to see where market intelligence could add the most value. It was recognized that especially in transforming information into intelligence by further analyzing it for specific problems and providing a central place where information could be easily located, found and trusted that market intelligence could add the most value. Second, in order to contribute the scientific literature, a comparison was done between the current study and the other studies that were recognized from the literature and focusing on the cultural aspects of MO implementation. This resulted in the first identification of common important factors that could serve as a catalyst for combining both views within one project and making sure that both objectives are sufficiently guarded during the implementation. These important factors were the use of top management support, creating a critical mass of support and understanding, and make a proper action plan so everyone in the organization gets aligned to a common goal. With the validation of the organizational problem and the added value of market intelligence known, solutions for redesign could be developed to facilitate Company X in their objective of reaching a MO.

In order to create proper design solutions, the design requirements as proposed by Van Aken et al. (2007) were specified, which resulted in the formulation of the design parameters. The design parameters were based on the three essential steps that are needed for a MO: intelligence generation, intelligence dissemination and intelligence use. The design parameters can be seen as knobs which one can turn in order to reach specific design solutions that can lead to a better performance of Company X due to lower levels of inefficiency. The parameters were set using the interviews and the specific wishes of them.

Based on these settings, a brainstorm session and a scan of the literature, eight solution directions were identified that each aimed at solving a particular part of the design parameters that were set. After a check against the design requirements that were specified in the beginning, seven of them were selected to form an integrated solution to the problems that were currently experienced within Company X. Since both rewards and training needed a higher level of knowledge over the organization and also spans a wider area then that was set by the current research, these solutions were not further worked out. Also, the solution of making a forum was spotted early on in the process, and since it represented a solution that was easily and quickly implemented, this solution direction was already implemented by the time this report was written en therefore doesn't need any further explanation. This left four solutions directions open to go into more detail: a market information system (MIS), structured documents, a knowledge map, and the after action review. These four solution directions

were then further worked out in more detail. The MIS provided the company with a first way of how their KPI's and KSF's could be successfully linked to the decisions they make and how one can make sure that the intelligence that is collected indeed supports the pressing needs of decision makers. Through the support of models, one can collect and further analyze the needed information and store this in the proper ERP systems, so decision makers can easily find the needed intelligence and view it whenever they need to. Furthermore, structured documents provided a way in which valuable information can be collected from sources around the company en can serve at the same time as checkpoints that the company needs to reach to deal with the current problems related to NPD. Also, a knowledge map can help in reaching a feeling of centrality of information without in fact the actual centralization of this information. It was found that specific kinds of knowledge were primarily located around one particular person. The knowledge map provides people with a clear overview of those people, their respective field of knowledge, and where to find them. Especially for people who are new in the company or new to a certain knowledge area, this can be a great tool to help people find what they need. That is why the knowledge map is frequently referred to as "company yellow pages". Last, the after action review guarantees that the intelligence that is collected is still needed. Environments are changing all the time and with it the informational needs for decision makers to be able to make their decisions properly. In order to reach this goal, one has to make sure that the needs and wants of decision makers are regularly checked for updates or missing information and adapt the process to these changing needs. A form was designed that could help facilitate this goal and keep track of all decisions that were made within the company and the reasoning behind it. In this way the evaluation about what is missing and what is not needed is much easier to make. Therefore, these solutions were proposed to facilitate the company in reaching their goal of successfully implementing a MO within the company.

Recommendations for the company were primarily aimed at considering the implementation of these design solutions and given the boundary conditions of this research, also study the parts of the company that have remained largely unaddressed by the current research. After all, one needs the full overview of the company before a MO can be successfully implemented. Since the current research was primarily aimed at the process oriented side of MO, recommendations were also aimed at approaching the cultural side of MO. A change in the current norms and values that are currently possessed by the employees of the company are in need of change, since a MO needs a whole different set of values then that is currently active. Therefore, a lot of work needs to be done here that one does not have to overlook. Last, a companywide introduction could be a long term plan that would, to some point, solve the boundaries that are currently noticeable between the different industry centers of the company and therefore need further consideration.

Finally, the contributions of this research were twofold. First, the current research was design oriented and therefore could help practitioners experiencing similar problems with solving some of them during the implementation of a MO. Second, the current research is among the first who specifically focus on the implementation of a MO from a process oriented perspective. This research resulted in the development of a framework specifically aimed at the process oriented side of MO, which was not currently available in the literature. Although a limitation is related to the one case scenario of the company, the author believes that the results are further generalizable to a larger context of companies

dealing with similar issues. However, further research should focus at further validating the given framework in practice and in a wider range of contexts.

List of abbreviations

ASM   Area Sales Manager.

CSF   Critical Succes Factor

CPG   Commerical Policy Group

FFS   Free For Sales

KIS   Knowledge Information System

KPI   Key Performance Indicator

MO   Market orientation

MI   Market Intelligence

MIP   Market introduction plan

MIR   Market introduction report

NPD   New product development

OOP   Offer – Order Process

PMG   Product Market Group

POR   Program of requirements

PSG   Product Sustainment Group

PTO   Product Technology & 0-series

SAM   Service Area Manager.

SG   Structural Group

SSU   Sales and Service Units

VP   Value proposition

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1. Introduction to the field of market orientation

1.1. Placing innovation, market orientation and intelligence into perspective

Innovation is important for sustainable businesses. Innovation is generally defined as: "the conception of an idea up to the introduction of an invention into the market" (Van haverbeke & Cloodt, 2006). Product life cycles are getting shorter, competition is intensified and new technologies are becoming obsolete much quicker then was the case in the past (Langerak and Hultink, 2005). A short time to market, which is defined as "the elapsed time from the beginning of the idea generation to the moment that the new product is ready for market introduction" (Langerak et al., 2008), is therefore necessary. Carbonell and Escudero (2010) consider innovation speed a core element of an innovation strategy for three reasons. First, innovation speed results in superior new product performance. Second, innovation speed can provide a sustainable competitive advantage, since it is mostly a team embodied, socially complex capability that is not easily copied by competitors. Last, due to the shrinking product lifecycles and intensified completion pressure is on the company to innovate faster and stay ahead of competition.

To be able to innovate successfully a firm needs sufficient market orientation (MO), which allows for making the right, market informed decisions (Li and Calantone 1998). MO can be defined as: "the organization wide information generation and dissemination and appropriate responds related to current and future customer needs and preferences." (Kohli and Jaworski 1990). Specifically, it entailed the following three points:

(1) One or more departments engaging in activities geared towards developing an understanding of customer's current and future needs and the factors affecting them (intelligence generation);
(2) Sharing of this understanding across departments (intelligence dissemination);
(3) The various departments engaging in activities designed to meet select customer needs (responsiveness).

Therefore, market intelligence is quickly becoming one of the most important factors for companies to deal with. Market intelligence is best defined by Calof and Skinner (1998) who conducted a thorough review of the literature and finally defined market intelligence as:

"The art and science of preparing companies for the future by way of a systematic knowledge management process. It is creating knowledge from openly available information by use of a systematic process involving, planning, collection, analysis, communication and management, which result in decision-maker action."

The definition of market intelligence as given by Calof and Skinner (1998) underlines the fact that intelligence generation extends beyond the mere collection of information, and also spans the areas of disseminating and effectively using market intelligence for decision making.

Although MO may be more important for market pull than technology push innovations it probably also serves the latter type of innovations by ensuring that technology driven innovations incorporate customer benefits that are met by customer demand. Consistent with this Kohli and Jaworski (1990) mention as an important point that the generation of market intelligence doesn't focus explicitly on current but also on future customer needs.

While the above suggests that Market intelligence management and information system development are critical to the development of a strong MO further evidence exists that the importance of good quality information is becoming even more important in the near future (GIA white paper, 2010):

(1) Companies' business environment is getting increasingly complex and dynamic, and, as a reflection of this complexity, accurate business information is needed not by one or two organizational functions but by virtually all of them.
(2) At the same time, decision makers are challenged by "information disconnect" that is not caused by lack of information as such, but by lack of time to digest it and to distinguish what is truly relevant for business.

1.2. Stipulating the gap in the literature concerning market orientation implementation and related goal of the research

To be able to deal with these points, organizations frequently organize market intelligence in an ERP system so all decision makers in the company can make use of it, whenever they need it to reap the benefits of it (Wei and Wang, 2011). The benefits that can result from systematically organizing a market intelligence operation basically facilitate three aspects: better and faster decisions, time & cost savings and organizational learning & new ideas. A well organized intelligence generation network, combined with intelligence dissemination supported by the right ICT tools, can therefore lead to quick responses and high quality decision making. Trainor et al. (2011) show for instance that ICT tools can positively influence the link between MO and performance. Therefore, solutions can be thought of can come in the form of ICT tools that can bring additional value to a good system.

However, little is known about how to build these market info systems and how to manage them. At best there are some case studies that have explored how organizations become market oriented and some even have developed roadmaps. Key conclusion from these studies is that there is a need for more studies related to MO implementation in different contexts and stages in the implementation process, to extent the knowledge in this field. Therefore, the academic goal of this research is to:

"Contribute to the current literature and develop knowledge in the field of
MO implementation, through the use of CIMO logic."

As stated in the academic goal, the aim of this study is to develop design propositions, through the use of CIMO logic, since this study is design oriented. This means that the purpose is not only to describe, but also prescribe knowledge so it can contribute to the field and help other designers creating solutions related to the implementation of a MO.

To achieve this academic goal, one has to study this phenomenon in practice. The case study seems the most appropriate method of choice to study a MO implementation. After all, an organizational problem related to MO implementation is aimed at contemporary events, poses its problem in a how or why question, and given the broad range of influences gives the investigator no control over actual behavioral events, which covers all relevant aspects to conduct a case study as proposed by Yin (2009).
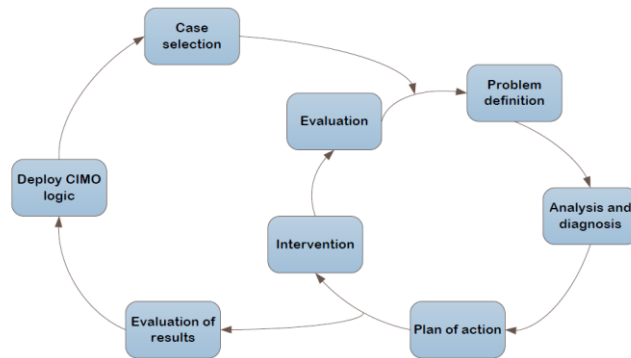
Figure 1 - The reflective and regulative cycle (Van Aken, 2007)

In order to cover all relevant aspects related to the case study, a combination of the regulative and reflective cycle will be followed after Van Aken (2007)(see figure 1).

The remainder of this report will be structured as follows. First, in the next chapter a review will be given about the MO literature to place this study into perspective. Part of which will be the development of a framework that is based on the MO literature thus far to guide the case study approach. Second, the case will be introduced together with the problem statement, the methods that were used during this research and the deliverables that can be expected from this research. Third, the analysis and diagnosis will be provided divided over two chapters of which the first will focus on the within case analysis and the second will compare the findings in the cross case analysis. Fourth, design solutions will be given that have the potential to solve the problem, as has been defined in the problem statement. Last, recommendations for further actions will be given; a reflection of the research project will be provided and conclusions will be drawn related to the research project.

2. Literature review

In this chapter, a short summary will be given about the most important parts of the literature study regarding market orientation (MO). For a complete overview see Van Kesteren (2012).

Kholi and Jaworski addressed MO focusing on specific activities of firms that had embraced and thus implemented the marketing concept. After a thorough literature review and a discussion with several managers, they stated that MO basically consisted of the following three elements: Intelligence generation, Intelligence dissemination, and responsiveness (Kohli & Jaworski, 1990). Together, these elements lead to the first definition of MO that was more focused on activities, instead of being just a philosophy:

"Market orientation is the organization wide generation of market intelligence pertaining to current and future customer needs, dissemination of intelligence across departments, and organization wide responsiveness to it." (Kohli and Jaworski, 1990).

In order to address the academic goal, as stated previously, the literature was reviewed about this action oriented side to market orientation. The remainder of this chapter will be structured using the definition of Kohli and Jaworski by first giving a short review over what is currently known regarding intelligence generation, followed by intelligence dissemination. Finally, based on this knowledge, the framework that was established to fill the current gap in the literature will be discussed.

2.1. Generating market intelligence and preparing the information for dissemination

According to Kohli and Jaworski (1990) intelligence generation is considered the starting point of a MO. While around that time this concept mainly entailed customer and competitor information this expanded over the years. Wright and Calof (2006) showed the importance of marketing intelligence; aimed at the development in market segments and marketing activities, while Rodenberg (2005) emphasized the need for technological intelligence. Also, rules and regulations showed to be important given the potential impact on both the company itself and its customers (Xu and Kaye, 1995). With this, the importance of the environmental factors for the company was again stipulated together with the need for a broader consideration of the areas of intelligence. Although these intelligence areas have become known in the literature for quite some time now, still little is known about the do's and don'ts related to these five intelligence areas.

Market intelligence, covering all intelligence areas as defined in chapter one, forms the basis for reliable decision making. Rodenberg and Tillman (2012) argue that in order to make effective decisions regarding which strategic actions to take, one has to translate the incoming information into intelligence following three steps (see figure 2). First, data is transformed into information by organizing it according to some criteria. Second, information has to be analyzed so it is translated into knowledge and third, an interpretation is given to this knowledge so it is translated into intelligence based upon which recommendations can be provided to decision makers about what strategic actions to take. These different steps simply represent different levels of decision making, since decisions can be based on both information as well as knowledge; it is merely what steps have been taken to make this

information more insightful so decisions can be made quicker and with more ease. Information, knowledge and intelligence are therefore closely related.

From this, one can conclude that the generation of market intelligence can be divided among five different areas. While the greatest potential of intelligence generation, as has been identified in the literature review, seems to lay with customer and competitor information, technology information received the most attention from researchers. Furthermore, intelligence generation was shown to extend beyond the mere collection of information and also include planning and analysis of the acquired information. However, specific details related to the intelligence areas as well as the mechanism that should be revealed with the analysis of this data have remained largely absent in the literature. Key features that were discovered from this overview seemed to point to mechanisms related to segmentation issues, product categories, customer preferences and rules and regulations that affect these preferences.

However the generation of intelligence, using all available sources from employees within the company, is not enough for becoming market oriented. One has to make sure that the proper intelligence is also disseminated towards the right decision makers. In order to know which decision makers needs what kind of intelligence. Rodenberg (2006) suggested to identify needs of key users and their problems to be able to support them accordingly. They used the term actionable intelligence for this, meaning that only intelligence is generated that is useful for decision makers. However, once the right actionable intelligence is generated it needs to be disseminated to the proper decision makers.

2.2. Intelligence dissemination and knowledge sharing issues
From the literature review (Van Kesteren, 2012), it became clear that the key aspect that could influence the dissemination of intelligence from the source to the recipient, could be influenced by several issues (see table 1).

The characteristics of the knowledge transferred	The source	The recipient	Contextual factors
Causal ambiguity	Motivation	Motivation	Media richness
Tacit knowledge	Reliability	Absorptive capacity	Arduous relationship
Codification vs	Personality	Retentive capacity	Barren organizational

personalization			context
Provenness		Mode of transfer	Culture
Complexity		Trust	Tension and conflict
		Heterogeneity vs homogeneity	

Table 1 - Known transfer issues identified from the literature

First, one issue concerning the characteristics of the knowledge transferred is causal ambiguity. Lippman & Rumelt (1982) define this as a problem that surfaces when the generative mechanism that leads to the success or failure of replicating a certain capability in another setting cannot be determined. An important aspect of this is the amount of tacit knowledge. Key here is that certain pieces of information are hard to put in written form (codification). When this is just not possible one has to personally transfer the knowledge by for instance face to face meetings. Furthermore, the provenness of the knowledge forms an important characteristic (Szulanski, 1996). Finally, the complexity of knowledge can lead to transfer problems. Complexity refers to the number of elements of a system and their richness of their interaction (Simon, 1962).

The second factor that influences knowledge sharing is the source itself. According to Szulanski (1996) both the motivation of the source, as well as the source its reliability can influence the success of knowledge transfer. Last, Hislop (2009) argues that the personality model might have an impact on knowledge sharing.

The third factor that influences knowledge sharing is the recipient. Szulanski (1996) argues that motivation plays also a role when looking at the recipient together with absorptive capacity. Szulanski (1996) argues that this absorptive capacity is a function of a pre-existing stock of knowledge and becomes apparent in their ability to handle new knowledge successfully for commercial ends. Furthermore, retentive capacity might play a role here as well. Szulanski (1996) argues that a transfer of knowledge is only effective when the knowledge that was transferred is also retained. Also, Hislop (2009) argues that trust and then especially inter-personal trust, influences people's attitude to participate in knowledge sharing. Last, the amount of heterogeneity vs homogeneity of the group plays a role in decision making (e.g. Keller, 2001)

The last influential factor that will be discussed is the contextual influence. Here the various communication mediums are discussed, where email provides a considerable lower level of media richness compared to face-to-face interaction, due to e.g. loss of social cues. Next, according to Szulanski (1996) previous research has shown that the context and culture in which transfer takes place influences both the number of attempts needed as well as the outcome of knowledge transfer. Also, an arduous relationship, which can be described as laborious and distant, can also make the transfer of knowledge harder (Szulanski, 1996). Finally, Hislop (2009) show that tension and conflict can play a role in knowledge transfer.

Therefore, these factors must be considered when implementing a market orientation and the process of intelligence dissemination is established. Proper ICT tools, such as a market information system (MIS) can assist in organizing this process. Wei and Wang (2011) refer with a market information system to "a strategic resource such as market information generation and dissemination, preceding a responsive

action plan design and execution" (Wei and Wang, 2011, p. 269). As such, they argue that a market information system functions as a strategic resource, based upon which strategic actions can be taken, which leads to a competitive advantage and thus a higher performance. Therefore, a market information system closely relates, and is in fact an essential part of the information-process oriented part of MO.

2.3.   Market orientation and IT

Narver and Slater (1990), Kohli and Jaworski (1990) and Day (1994) are one of the first researches which considered IT as a variable to be influential in the MO – performance link. Day (1994) suggested that IT has the potential to enable organizations to develop new capabilities and skills which could distinguish them from competitors. Based on this, other researchers started to involve IT in the MO context and found that the strategic use of IT could positively influence MO (e.g. Overby et al., 2006). Hult et al. (2005) added to this line of research and even though they found a positive link between market information processing (MIP) and MO on the one hand, and performance on the other, no interaction effect was found between MO and MIP. Wei and Wang (2011) expand the work of Hult et al. (2005) by taking a closer look at the link between MO and MIS and found that MIS indeed has a positive effect on organizational responsiveness and innovation strategy. They draw upon the MO definition of Kholi and Jaworski (1990) and refer with a market information system to "a strategic resource such as market information generation and dissemination, preceding a responsive action plan design and execution" (Wei and Wang, 2011, p. 269). As such, they argue that a market information system functions as a strategic resource, based upon which strategic actions can be taken, which leads to a competitive advantage and thus a higher performance. "An effective market information system acquires, sorts, and classifies information and can simplify and share information to reveal coherent patterns. It is a strategic resource in that it provides managers with the information they need to relate to the external environment." (Wei and Wang, 2011, p. 268). Therefore, a market information system closely relates, and is in fact an essential part of the information-process oriented part of MO.

To conclude, the literature showed that IT, and more specifically a market information system, has shown its ability to facilitate a MO and enhances its positive effect on performance when implemented correctly. Therefore, the next section will focus on what is currently known about correctly implementing a market orientation and the accompanying IT.

2.4.   Studies related to MO implementation thus far.

Even though companies see the benefits of implementing a market orientation, studies have remained largely absent in this field. Recent endeavors focusing on the implementation of MO have aimed to delve deeper and experience it and first hand and taking it out of the controlled environment and thus rely on case studies. Berverland and Lindgreen (2007) conducted their own case research within two agriculture companies, while Gebhardt et al. (2006) conducted research among four different companies in other phases of the MO implementation process.

What became clear from these studies was that actually two views are needed to implement a MO within a company: information centered and cultural centered. The need for both has been established in the literature thus far. While several attempts to the correct way of implementing the cultural side of

MO have already been undertaken, the information centered view has remained in its infancy. Main findings thus far related to the implementation of a proper reward system and the communication of the impact on performance for stimulating intelligence generation and dissemination behavior, as well as the possible use of a test case before full organizational wide implementation. Furthermore, researchers argued that of the two aspects concerning both implementation views, the cultural would be more useful in the beginning of the process to create support for this new view and changing current values and believes, while the information centered approach would become needed at the end of this process so people would actually use the implemented systems to their and the companies benefit. However, only little is known about the implementation of these systems and the building of considerable intelligence databases to base the decisions on. A few studies have been identified that emphasized the use of IT for creating a central data warehouse where information can be easily stored and analyzed and providing an internal portal for easier access. Also, linking this system towards other parties, like suppliers and customers, would have the potential to even further increase the responsiveness to environmental change. More studies should therefore focus on the process of building information systems for a successful market orientation to further investigate this subject.

2.5. Design of the framework for the process of building and using information systems to ensure excellent market orientation.

To address the gap that was identified in the literature a framework regarding the building and use of information systems for market oriented purposes will be developed to use for future research. This will be done using the three actions that were central in this literature review: intelligence generation, intelligence dissemination, and intelligence use. This framework uses the literature review as a basis and propositions that will be made by the author (see figure 3).

In order to know what intelligence needs to be generated, an analysis of the bottlenecks that are currently affecting the difference between the current and the ideal situation needs to be analysed. As argued by Rodenberg (2006) one only wants to gather actionable intelligence and therefore a thorough needs and wants analysis need to be conducted among decision makers to find out what kind of intelligence they actually need. As has been stated previously, five areas of intelligence were distinguished that can influence the information gap that exists among decision makers. However, also knowledge transfer issues or problems that surface during decision making might influence this gap since not all available information might in fact reach the decision maker. Therefore, in order to know how the current system has to be changed, one first has to identify the relevant bottlenecks across the different cases.

Once the bottlenecks have become clear within the organization, one can determine which intelligence has to be generated in order to decrease the gap that currently exists. However, as has been noted earlier, intelligence generation extends beyond the mere collection of information. Therefore, in this research a distinction is made between the collection of information, validation of this information, further analysis of the information into intelligence and finally storing the intelligence (e.g. Rodenberg (2006), Montgomery & Weinberg (1979), Calof and Skinner (1998)). By implementing these steps within an organization uncertainty is effectively reduced and decisions can be made based on all available

information within the company that is centraly available for use. Therefore, intelligence generation is of great importance for preventing mere data collecting and providing added value for decision makers by providing market intelligence that they need and is ready for use.
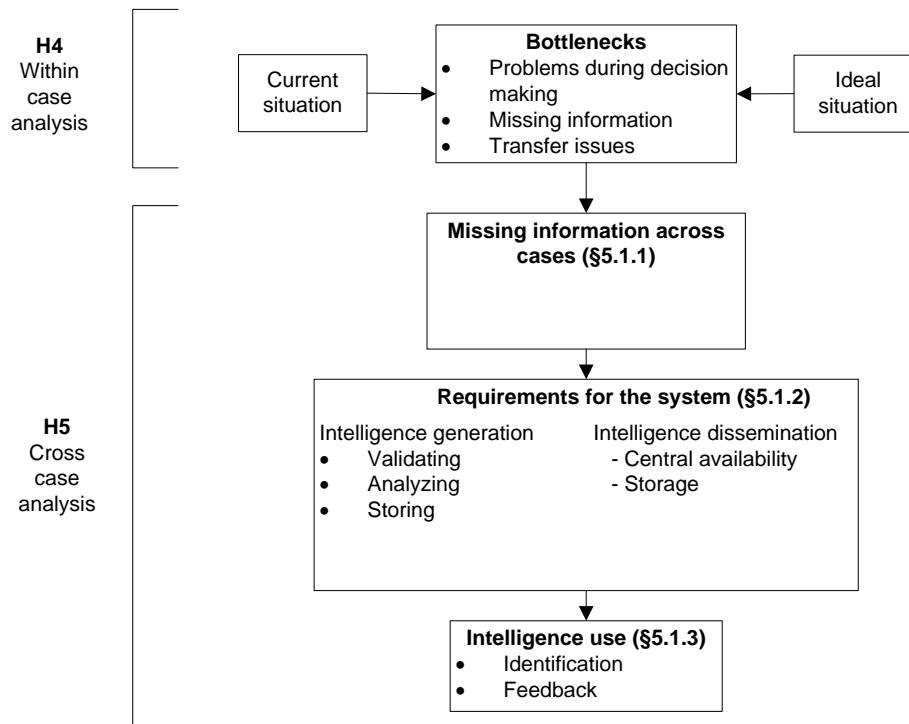
Figure 3 - Framework for MO implementation

Next, once this market intelligence is under control, it has to be disseminated to the right decision makers, usually with the help of a market information system. Here the transfer of intelligence between the source and the recipient is considered. Both the source and the recipient have certain transfer issues that can influence the success of the transfer. The intelligence generated has to be stored in a central system. As already stated, IT has shown to have a positive effect on MO and can serve to centrally store the generated market intelligence and providing a quick and easy access point for the recipients who want to make use of it. Therefore, a successful market information system (MIS) supports the centrality of validated market intelligence that is specifically collected for individual decision making purposes.

Last, in order to make full use of the generated and disseminated intelligence, one has to make sure that decision makers know how to find this intelligence and provide feedback so the system can be updated accordingly. After all, environments can change quickly. Since market intelligence is externally focussed the system should change accordingly to adapt to this changing environment and support the decision makers within the company as good as possible. This can only be done when the people using it provide sufficient information about the usefullness of the intelligence received. Therefore, the building of succesful MIS heavily depends on the input that is provided to the system and the feedback received from the users so the system can remain up to date and in full support for the people using it.

The remainder of this report will server to see how an MIS is best build within a company (see figure 4).
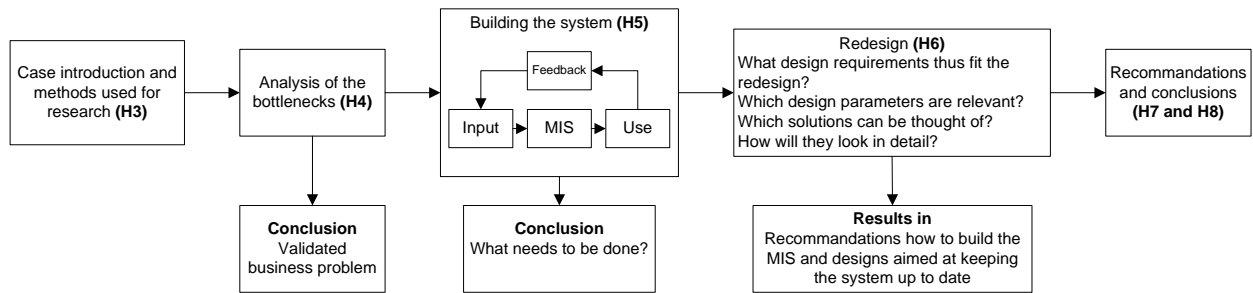
Figure 4 - Structure of the report

3. Methodology

In this chapter the methodology that will be leading the current research will be discussed. First, the case will be introduced followed by a description of the problem and the deliverables. Next, the unit of analysis that will be central for the academic and practical goal will be discussed, followed by an explanation of the methods of data collection and analysis. Last, the steps that were taken to guard the quality of this research will be discussed.

3.1. Organizational and problem context

The company in which this graduation research took place is masked to guarantee confidentiality of the company. Therefore, the organizational context has been removed from this report. Therefore the company will be referred to as Company X.

The problem which is currently faced by Company X constitutes the following. First, the environment of Company X isn't what is used to be. While the market was first concentrated in Western Europe, emerging markets like China, India and Brazil changed this playing field considerably. Also, with the arrival of internet and other channels of information, constantly keeping up to date with the latest information is becoming a very time consuming activity for decision makers. Furthermore, Company X is in a growth phase and expanding quickly. The mere size of the company is becoming a problem since information sharing methods like telephone, mail and direct contact shows to be highly inefficient. Currently, no central point of information collection is active within the firm leading to dispersed information streams. This is an obstacle for the four decision making bodies when important decisions have to be made. After all, this lack of centrality leads to unnecessary long processes of information gathering. Because there is no knowledge about which decision maker needs what kind of information, this inhibits possessors of important information to send it further to all relevant parties (see appendix A for a detailed problem statement). This results in the following problem statement.

The way in which external information gathering is done in the current situation is highly unsatisfactory due the high levels of inefficiency, leading to a lower rate of performance.

The decision making groups that experience the most trouble from this lack of structure in external information gathering and thus can benefit the most with the implementation of a MO are: the CPG, PMG, PSG and the MT (see appendix B).

In conclusion, Company X is well suited to be used as a case study to accomplish the academic goal as has been set in chapter one. The above mentioned groups can then be used to investigate at which stage of the MO implementation process Company X currently is and which steps need to be taken. The problem statement together with the research deliverables and research scope will be formulated next.

3.2. Problem statement

The formulated organization and problem context lead to the following research question:

"How can market intelligence best add value to the decision making process
of the company?"

Sub questions relevant to this research question are the following:

- What is the current situation related to the relevant decision makers
- What is the ideal situation the decision makers are aiming for?
- Which bottlenecks thus exist?
- How can the current MIS be altered to solve the current bottlenecks?
- Which design solutions can be provided to keep this MIS efficient and effective?

In order to set the proper goals for this research and to make clear what to expect, the research deliverables together with the boundary conditions will be discussed next.

3.3. Research deliverables

The focus of this research will be on the sales process towards innovation, because the primary need experienced for a proper MO came from the sales department. Therefore the practical goal of this research project will be to:

"Improve the quality of decision making by designing ways in which external information can be used as optimal as possible with the use of the market intelligence position."

This results in the following deliverables:

- Description of the current situation of the decision making process
- Formulation of the related external information gaps, process bottlenecks and side issues identified during this research, based on the ideal situation.
- Design suggestions related to the discovered gaps to improve the current situation.
- Provide advice about the course of action that can be followed to complete the MO implementation process.

Due to time availability, the project will not cover the implementation phase as described in the regulative cycle as mentioned in figure 1. The methods that will be used to accomplish this will be formulated next.

3.4. Unit of analysis

The unit of analysis in this study is twofold. First, in order to find an answer to the practical goal of this research, the unit of analysis will be the decision process of the company. Before decisions can be made, one has to have a good foundation on which these decisions can be based. This starts, as can be seen in figure 6, with gathering the relevant data. Once this data is gathered it can be organized in certain ways to create information, after which an analysis of this information leads to knowledge. Intelligence is then created by an interpretation of this knowledge, based upon which recommendations can be provided to the relevant decision makers. In each case, the decision will be taken under consideration, and the relevant sub levels, as shown in the pyramid, have to be assessed to see how the most optimal level of decision making can be reached with respect to market intelligence. Second, to accomplish the academic goal of this research, the company will be taken as the unit of analysis to see how a MO is best

implemented within a company, especially when focusing on the information-process approach related to MO.
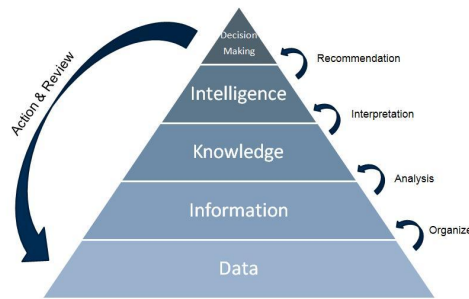
Figure 6 - Decision making pyramid (Rodenberg & Tillman, 2012)

3.5. Data Collection

In order to increase the reliability of the research, triangulation is used for data collection. This means that multiple sources of data gathering are used to be able to check the collected data and look for similarities.

First, interviews were held and represented the most important way of data collection. For this purpose the so called "focused interview" was used which, as stated by Yin (2009), is still an open-ended interview; however the interviewer is more likely to follow a certain set of questions derived from the case study protocol. As proposed by Miles & Huberman (1994) a framework was made, based on the relevant literature, so proper questions and related probes could be made (see appendix C and D for the interview framework and questionnaire respectively). This framework was then used to interview members of the three groups. Each interview was done in the native language of the interviewee, so language would not be a barrier to come up with all relevant information concerning the topic of interest. In total, 29 people were interviewed, which was considered sufficient for this purpose. This view was confirmed when looking at the first interview compared to the last when considering both the duration and the amount of new information attained. (For a detailed overview of who was interviewed see appendix E).

Second, a survey was send to all relevant decision makers. The purpose of this survey was to get a good understanding of what the most important decisions are that have to be made by the decision makers and the corresponding intelligence they use or ideally want to use, the availability of these information and the importance. This survey is based on a method developed by Rodenberg & Tillman (2012). An example of such a survey that was send to members of the PMG can be found in appendix F. The average responds rate of the survey was 50% which was enough to get an initial view.

Third, procedural documents were used as a source of data collection. Frequently, protocols about how decisions should be made or information about the role and function of the different decision makers under study, was readily available in documents. These were then validated during the interviews, since these documents might be out of date or lack the necessary accuracy.

3.6. Data analysis

Each interview was recorded and typed up. Next, transcriptions were used for qualitative text analysis. With the use of Nvivo all interviews were coded to be able to link the interviews together and be able to draw grounded conclusions.

For the coding a first differentiation was made based on the role of the interviewee. To prevent drawing conclusions while coding, words were selected according to the framework. First the decisions and information was coded when these were mentioned. Information was further split up between market, customer, competitor, technological, and rules and regulations. Within each of these information streams a distinction was made when the interviewee talked about the current and future/ideal situation. These were then grouped and put together into individual tables. Based on these tables, insight could be gained about relations between subjects. Decisions on the other hand were grouped when related to the same decision to create a good overview of the different decisions within the CPG, PMG, and ASM. Next, bottlenecks were coded and grouped together. A distinction was made between process based bottlenecks (related to how decisions were made) and bottlenecks in information (the so called information gaps). Last, knowledge transfer issues were coded according to the ones discovered in the framework. This resulted in an overview in which for each group interview text was coded related to the current situation, ideal situation, bottlenecks and knowledge transfer issues, which provided a good insight into the subjects relevant in this research.

3.7. Steps to ensure the quality of the research

The quality of the research should be taken into account when making the research design. Therefore, the following steps were taken to cover the relevant issues when considering research quality (see table 2).

Issue	Action taken
Construct validity	• Multiple sources of evidence • Establish chain of evidence • Review progress with relevant people
Internal validity	Pattern matching
External validity	Replication logic assessed in the end
Reliability	• Use of case study protocol • Recording all interviews • Transcribe all interviews for coding • Coding all interview transcripts • Check for quality of interview questions • Number of interviewees • Response rate of survey • Making use of interview quotes during analysis

Table 2 - Actions taken to ensure the quality of the research

To cover the concept of construct validity multiple sources of evidence will be used to gather the relevant data. Also, the chain of evidence from formulation of the problem to the final conclusions of the research will be carefully documented. Last, intermediate results will be communicated to key informants to provide an option for a review so changes can still be made when errors will be discovered. Next, internal validity can be assessed by pattern-matching which compares an empirically

based pattern with a predicted one. Furthermore, the case study relies on analytical generalization in which the investigator is striving to generalize a particular set of results to some broader theory. Replication logic is therefore important for the purpose of assessing the external validity of the case study and will be assessed in the end with the reflection phase. Last, the reliability will be guarded by following the method as described in the reflective and regulative cycle and will be thoroughly reported upon at the end of this report. By taking these issues into consideration, the quality of this research can be ensured which provides sufficient ground for accomplishing both the academic as well as the practical goal of this research.

In the next chapter, a detailed analysis of the interviews will be given in order to find an answer to the research question posed at the beginning.

4. Within case analysis

In this chapter, an analysis of the interviews, concerning the groups that represent the sales side of decision making towards NPD, will be provided here. For understanding the relevant factors that are discussed in this chapter, one has to bear in mind the information-process oriented MO implementation process as has been described in chapter two. Therefore, the structure of this chapter will be as follow (see figure 7)
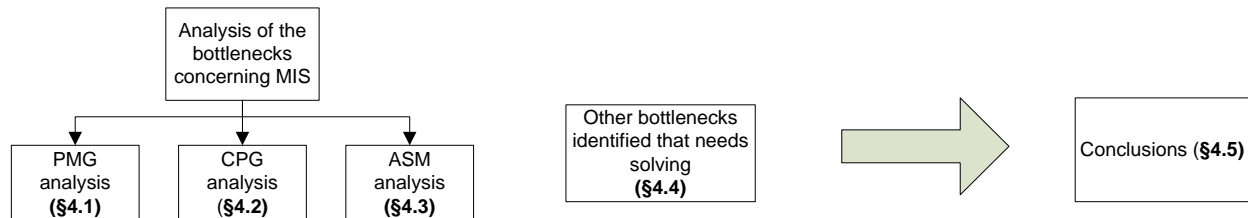
Figure 7 - Structure of the within case analysis

In this chapter some references are made to the product innovation process of Company X, when in need for a better understanding of this process, the reader is referred to appendix G for a short description of this process.

4.1. Bottlenecks concerning the PMG decision making

PMG meetings are planned once a month to discuss all topics that are on the agenda. Members in the different countries join this meeting either in person or by the use of teleconferencing. Each time a delegation of the Dutch members fly to ████████ to attend the meeting from there to be able to guide the process better. Before each meeting, a deadline is provided which signals the point in time where all incoming materials related to the upcoming meeting must be provided. This incoming material can be anything, from reports that seemed relevant for the industry to strategic insight that are provided by the CPG. Each member has to read this information upfront after which each topic will be addressed in the meeting. Besides the monthly meetings, the PMG members gather once every year to discuss the innovation plan of the next year. Here, the innovation roadmap for the next year is made which will serve as a guideline for the decision that are made in the monthly meetings. Decision making of the PMG in the monthly meetings constitutes the following:

- Decisions about which projects may enter the innovation process
- Gate decisions in the A, B and C phase about which project may proceed to the next phase
- Of the project that are selected to proceed one distinguishes short term and long term projects and the PMG keeps the balance between those two in check
- Decisions related to changes in the field of intellectual property

In order to address the bottlenecks related to the MIS the amount of missing information will be analyzed (see appendix C), after which decision making problems will be discussed and finally transfer issues that became evident will be explained.

4.1.1. Results related to missing information identified of PMG decision making

Due to the highly confidential nature of this information, this section is removed. Six bottlenecks were identified here related to missing information concerning decision making, which were classified further by frequency they were mentioned to provide some sort of priority setting. Quotes from the interviews were used to support the bottlenecks found and provide a foundation for each of the claims.

4.1.2. Results related to problems experienced during PMG decision making

Once the information gathering process is done, the information still needs to be validated, analyzed, stored and disseminated to the right people in order to support people in decision making. The bottlenecks that were identified here will be discussed next.

Validation

Although most of the information that is collected for the PMG meetings is validated by the use of trust in the source the information came from instead of using multiple sources of evidence. Due to this, a lot of room is left for discussions during those meetings caused by this lack of evidence. An interviewee stated the following about this subject:

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This underlines the fact that a proper validation of the information gathered needs to be done before bringing it in to the PMG meetings. The current way of working, relying on belly feeling and non-codified knowledge of experienced people in the meeting, doesn't provide a trusted basis of information provision which causes overly long discussions and decisions that are made on "best guesses".

Analysis

The data that currently is available in codified form for decision making is frequently presented to the decision makers without any proper analysis transforming the data into actual intelligence. This causes a huge amount of time needed to read the information available and usually results in the fact that not all relevant information is considered in decision making. After all, retaining all information once read is nearly impossible when unanalyzed reports are concerned.

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Therefore, the level of analysis in the PMG decision making needs to be increased in order to save decision makers from useless details and enables them to make grounded decisions based on validated and analyzed information that serves their purpose.

Storage and level of centrality

Storing the information in a market information system and centralizing the knowledge that belongs together is one of the main problems for Company X. This frequently results in the fact that not all information is at hand when important decisions have to be made. An interviewee stated the following about this subject.

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The fact that information is not stored centrally not only prevents the decision makers from making decisions on all information available in the company, but also makes the system valuable for essential knowledge loss. Knowledge holders might keep this information in non-codified form, preventing a recovery of the information when something happens. An MIS focused on centralizing and storing all important information can add to this and provide an easy way of accessing information, which is clearly absent at the moment.

Identification

Identification is all about the fact of enabling decision makers to identify all relevant information for the decision they want to make, which is currently at a suboptimal level within the PMG. Information comes in from many sources and the job of bringing this information to the table is currently devoted to the individual members of the PMG representing different departments within Company X. Since the NPD related decision of the PMG require a very diverse amount of information, sources are frequently dispersed over the organization. Because of the absence of a centralized place for information storage within the current MIS, identification of all relevant information is a very time consuming exercise. Therefore, in order to use the prober intelligence for decision making, centralizing all knowledge in a proper MIS system would be very helpful for PMG decision making.

Feedback

Feedback loops, to keep the system up to date and effective in helping people make decisions, are currently largely absent within Company X. The environment of Company X is subject to change and therefore the intelligence gathered about this environment needs to be updated regularly based on feedback of the usefulness of the intelligence provided to decision makers. As accentuated by the following statement, this is currently not sufficiently covered in the PMG.

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Therefore ways have to be thought to keep the system active and up to date so decision makers of the PMG can rely on relevant intelligence.

In sum, several bottlenecks related to PMG decision making and the related system supporting this have been identified. In order to reach a proper MO implementation these bottlenecks have to be resolved.

4.1.3. Results related to the transfer issues concerning PMG decision making

Besides the previous mentioned bottlenecks, the biggest bottlenecks related to the sharing of information and knowledge in order to make the decisions, were the following. First, retentive capacity is currently a real issue. Because of the large amount of incoming pieces for each PMG meeting and the low level of analysis and summarization, it is difficult to remember all relevant pieces of information in the meeting. This also has to do with the diversity of the projects at hand, and the diverse involvement of disciplines in the meeting. Furthermore, with the current lack of understanding/acceptance between the US and European counterparts, there are some cultural issues that needs to be resolved. Potential customers in the US have a different mindset compared to customers in Europe, also rules and regulations can be very different between the two. When there is not enough understanding of these differences in the PMG meetings, wrong product market combinations can be developed for the US market and people will not provide this information anymore because it is not taken into account anyway. Last, causal ambiguity is a problem which relates to the inability to reduce the uncertainty to zero. This is not always possible when long term innovations are concerned and one has to start gathering long term information more consistently and trust that this information provides a good indication about what to expect. This doesn't however mean that one has to fully rely on this, a good balance need to be attained here to solve this issue. In order to accomplish a better MO, one has to solve the bottlenecks related to retentive capacity, culture and causal ambiguity, to make full use of the market intelligence that is available in the company.

4.2. Bottlenecks concerning CPG decision making

Just like the PMG, the CPG has a monthly meeting scheduled as well with the same procedures to provide input before each meeting. Similar to the PMG, members in the US and the Netherlands are joined together using teleconferencing. Upon analyzing the interviews two main streams of decision making could be discovered being the strategic decisions related to product development and operational decisions related to the existing product portfolio. These decisions could be further split up in the following decisions.

Strategic decisions
- Commitment to the sales figures estimate in the POR
- Giving the final go to the value proposition
- How to introduce new developments in the market and realize sales/service volume of it
- How to realize and support strategic positioning of Company X
- With whom Company X can partner with

Operational decisions
- Lifecycle management of existing equipment

- Product and service pricing
- The commercial approach which needs to be taken for existing products
- How to deal with sales and service issues

In order to address the bottlenecks related to the MIS the amount of missing information will be analyzed, after which decision making problems will be discussed and finally transfer issues that became evident will be explained.

4.2.1. Results related to missing information identified of CPG decision making

Due to the highly confidential nature of this information, this section is removed. Four bottlenecks were identified here related to missing information concerning decision making, which were classified further by frequency they were mentioned to provide some sort of priority setting.

4.2.2. Results related to problems experienced during CPG decision making

Once the information gathering process is done, the information still needs to be validated, analyzed, stored and disseminated to the right people in order to support people in decision making. The bottlenecks that were identified here will be discussed next.

Validation

Validation is also a problem in the CPG since a lot of information is kept in the head of people with a long time experience in the business, which leads to long time discussions since this information is not verified. An interviewee referred to this subject as follow.

Due to the low level of codification, the information used in the decisions can only be verified at the moment that a CPG member brings this information to the table leading to discussion because people not automatically trust this kind of non-codified information. This doesn't mean that only single sources are used for decision making, but that sources can't be crossed checked against each other and validate the information further. Therefore, codifying all available information and cross checking this information with multiple sources could lead to trust in that the information is right and thus efficient decision making.

Analysis

Similar to the PMG, also the CPG level of analysis for decision making is low. Information brought into the meetings are frequently entire reports without the interpretation of people what this means for certain decisions and thus for Company X. This was expressed as follow.

Therefore, a system related to the further analysis of information by preparing them for the decisions at hand eases the decision making and make people see and believe that what you tell them is actually right. One example of an analysis that can really help in creating insight in the strategic decisions that have to be made in the CPG is the value proposition. This sheet represents the analyzed information related to new developments and whether the external factors in the environment of the company support the internal focus. An interviewee stated the following about this subject.

This accentuates the fact that further analyzing of the data can have serious consequences for the CPG but also on the revenue of Company X as a whole. Therefore, further analyzing incoming information should be a primary concern when dealing with an MIS for decision making.

Storage and level of centrality
Information currently comes in from different sources like PTO, ASM and service but currently isn't brought together in a central place where it is easy to find. All departments work with individual maps on the main server of the company that is usually restricted for use by most other departments making it impossible to access this information centrally. This information then has to come as "incoming material to the CPG meeting" which also prevents further analysis by combining pieces of information further. The combination of masking information on the main servers of Company X and using the experience of people as main source of information results in a lower level of analysis and prevents other parties from using valuable information in for their own decision making.

Identification
As stated previously, information that is not codified is hard to identify for decision making. Besides this fact, decision makers who prepare information package as incoming material for CPG decision making do frequently have to put great effort into acquiring all information from the different sources in the company. Even though members of the CPG represent the three areas of marketing, service and sales, non codified information can easily slip through the mazes. Therefore, centralizing the information that is generated from the different sources within the company enables decision makers to localize and identify all relevant information available in the company and thus seems a logical step to pursue in the future.

Feedback
Feedback loops in the CPG about the information that is used and provided to other groups like the PMG are currently not active. An example of this is the sales figures that are estimated each time a new

product development is set up. In order to see whether the new product indeed has potential and is worth pursuing, sales figures in the first and second year are provided. An interviewee stated the following about these sales figures.

Even though the absence of time and reliability indication, no indications of how far off the estimates where compared to the actual sales figures are given. Due to the absence of this feedback no improvements can be realized on this part and no further analysis can be done about what went wrong and thus what information was missing causing the discrepancy. Therefore, feedback loops can help the CPG in improving the decision making process by further analyzing the situation about what went wrong and what thus needs to be improved the next time.

In sum, several bottlenecks related to CPG decision making and the related system supporting this have been identified. In order to reach a proper MO implementation these bottlenecks have to be resolved. Next, bottlenecks related to the transfer of information will be further analyzed.

4.2.3. Results related to the transfer issues concerning CPG decision making

The biggest bottlenecks related to the sharing of information and knowledge in order to make the decisions are the following. Absorptive capacity, which is related to understand new information based on the current level of information, is mostly the problem for the people who are not able to rely on long time experience in the business. Although this may currently be only 4 out of 10 people this will become much more of a concern in the future and needs to be handled before it becomes a real problem. Also, the same cultural issues related to a lack of understanding/acceptance of the differences between US and European market sometimes leads to problems in decision making. Last, key in the decisions made within the CPG is that reducing uncertainty to 0 is just not possible. Especially in the strategic decisions that have to be made, there are unavoidably factors that one can't know for sure. What is the market going to do five years from now? What are the true customers needs then? Key is to use indicators for this to reduce this uncertainty to acceptable levels. With the current methods of using people's experience or gut feeling as an important aspect in this process does not suffice. This knowledge is hard to express (and thus has tacit components) since it has been build up over the years working in the same industry. However, taking courses of action to try to get this mental picture of the competitor, market place and customers codified, by focusing on solving the bottlenecks that currently exist, give the other members of the CPG also more insight in both the industry as well as the reasons why certain decisions are made. These issues have to be looked into to be able to accomplish a higher degree of MO and a quicker and better response towards the customer.

4.3. Bottlenecks concerning ASM decision making

Each ASM gets his own geographic sales area assigned to him in which he must realize his given sales target. Each sale is evaluated, either won or lost, as an end report of the progress thus far. Also, each ASM has to provide a monthly market report about developing trends related to the external

environment of their respective sales area. Within these reports lay there close relationship with the CPG and PMG as members of these groups read the reports as input for their respective decision making. Furthermore, as part of the internal launch of new product development, the ASM have to be informed about new products and their related advantage. In this way, products that are given free for sales after completing the innovation process can be quickly introduced to the market. Besides this link to the strategic processes of Company X, ASM have their own decisions to make. The decision making of the ASM can be largely split up between two areas: internal focused and external focused.

Internal focus
- Priority setting within the organization (e.g. importance of a customer, when does a quotation needs to be finished.)
- Prognosticating chance of success for production capacity (requires deeper understanding of customers while at the same time preventing the customer relationship from becoming one way traffic.

External focus
- How to make a sale?
- How to offer to customers
- Which customers to approach (emerging markets versus mature markets)
- What is the best way to offer a quotation to a customer / which technology to choose?
- How to deal with customers (e.g. cultural aspects)

In order to address the bottlenecks related to the MIS the amount of missing information will be analyzed, after which decision making problems will be discussed and finally transfer issues that became evident will be explained.

4.3.1. Results related to missing information identified of ASM decision making
Due to the highly confidential nature of this information, this section is removed. Four bottlenecks were identified here related to missing information concerning decision making, which were classified further by frequency they were mentioned to provide some sort of priority setting.

4.3.2. Results related to problems experienced during ASM decision making
Once the information gathering process is done, the information still needs to be validated, analyzed, stored and disseminated to the right people in order to support people in decision making. The bottlenecks that were identified here will be discussed next.

Validation
Validation is not a primary concern for ASM since they frequently rely on sources that have proven their trustworthiness over the years. Also, needed information can also be acquired from individual customers which is usually on an operational level and therefore easily verifiable. Validation here is more applicable to the information that ASM have to provide to the organization about trends and other development in their respective sales area and the quality of this kind of information. Therefore, validation is not a real bottleneck here.

Analysis

Since the primary concern of the ASM'ers is to sell as many products as possible analysis is not a primary concern. However, this doesn't necessarily mean that further analysis of information can't help them in achieving better results. For example, deeper competitor analysis about what they are doing, how they are offering their products to customers and customer analysis providing details about the age of their respective machines can help them to spot opportunities on an early basis or take corrective actions concerning approaching a customer when necessary. However, since these analyses currently take place in the heads of people in the CPG and PMG, this results in unavailability of this kind of intelligence for the rest of the organization. Therefore, further analyses of this kind of information can assist ASM in selling more products and accomplishing the status of preferred supplier towards their customers.

Storage and level of centrality

The level of centrality and storage of valuable information among the ASM is not very well organized at the moment. A main point here is that a combination of time it takes to codify the knowledge and not having the right tools to store it in are causing this bottleneck.

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This accentuates the importance of developing a system in which information is centrally stored and accessible for use. As a consequence of the absence of this kind of tools ASM are frequently gathering the information they need and storing this on their local computer.

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Therefore, a centralized system could help the ASM to share information amongst each other and prevent them from doing work that is already done or long searches to find what they need.

Identification

In order to use all useable intelligence and tools for decision making, one has to be able to easily identify this. Given the absence of a central system for knowledge sharing every ASM is stock piling this kind of information on their own pc. However this causes some additional problems.

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Availability of this kind of information therefore heavily depends on "walking into each other" or hearsay from other ASM.

Feedback

The main form of feedback currently active among the ASM relates to the loss of sales and reflecting on this process. This can provide useful information for the CPG and PMG in that products can be changed because competitor products are currently better or price cuts have to be realized. However, this process is highly subjective.

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Furthermore, feedback about the quality of information that ASM provide to the CPG is not really challenged. Each ASM has to provide a monthly update report about their respective sales area. However, the quality of these documents varies a lot and with no active consequences on the quality of the work provided this is not likely going to change, even though the insights from people experiencing the market on a daily basis can be very valuable. Therefore, changes have to be made to improve the feedback of the information that is provided by the ASM and challenge them to provide good quality information aimed at decision maker needs.

In sum, several bottlenecks related to ASM decision making and the related system supporting this have been identified. In order to reach a proper MO implementation these bottlenecks have to be resolved. Next, bottlenecks related to the transfer of information will be further analyzed.

4.3.3. Results related to the transfer issues concerning ASM decision making

Besides these bottlenecks, transfer issues that proved to be most disturbing are the following. First, retentive capacity, related to the amount of information that one is able to remember, can be an issue when a lot of information is provided during the ASM days. A better process of providing the presentations to the ASM at a logical location would improve this, since ASM would then be able to read this information again. Next, there were some small issues noticeable in the relationship between ASM. Both have their own targets to get to and thus have their own interest. Information is less often shared here given the competitive edge that is noticeable at this point. Last, although the level of codification related to relevant information is relatively high, the lack of centrality or knowledge of the whereabouts concerning particular bits of information inhibits taking full advantage of knowledge within the organization. In order to make full use of a MO and the available intelligence, these issues have to be resolved as well.

4.4. Other bottlenecks identified during the research not related to the MIS

During the interview and the analysis to find all relevant bottlenecks related to building an MIS system for Company X, other bottlenecks were identified that currently hamper decision making but are not related to the process of building an MIS system for Company X. However, in order to create a good MO, these bottlenecks have to be dealt with too and will therefore be shortly described to bring them under the attention. Since these are not related to the primary aim of building an MIS system for Company X, these bottlenecks will not be further worked out (see appendix H).

4.5. Conclusions

Based on this analysis several issues were identified that determine the current gap related to Company X. These are the bottlenecks that are currently active and represent the gap between the current situation and the ideal situation of Company X. We will further zoom into this topic during the cross case analysis in which the research question, as posed in chapter three, will be answered.

Based on the current analysis and the problem statement as has been mentioned in chapter three and further described in the initial research proposal, this all leads to the validated cause and effect diagram as can be seen in Appendix I.

Based on this cause and effect diagram, a cross case analysis will be performed in the next chapter, after which design solutions will be developed to deal with some of the issues that have been identified.

5. Cross case analysis

In this chapter, a cross case analysis will be done to identify the common factors across the three cases, distinguished in the previous chapter, to see what needs to be done to successfully build an MIS for decision making support. Here we will try to find an answer on the central question related to the practical goal of this research. In order to do so, the intelligence generation, dissemination and use process that is central for an MIS will be discussed next. Last, a comparison will be made with other cases studies related to the implementation of a MO, to address the academic goal of this research and add to the academic literature.

5.1. Requirements for an MIS for the three decision making groups of Company X

From the bottlenecks analysis, across the different decision making groups follows that there is a growing body of strategic information need. This starts with the ASM where the amount of strategic information required is relatively minor and ends with the long term vision that is required within the PMG. Although this signifies a difference in the strategic level of the decision making bodies several similar needs could be identified when looking at the five information areas as identified in the literature (see appendix J).

5.1.1. Missing information across decision making groups

Here a cross case analysis was made to see what the similarities were concerning missing information in the the five intelligence areas: Market, Customer, Competitor, Technical and Rules and regulations. Based on these insights the size of the gap was analyzed and expressed in four different categories being: large, medium, small and nonexistent. Because of the confidentiality of this information, this section has been removed.

5.1.2. Analyzing and codifying information for the MIS and decision making support

Besides the amount of missing information, the current intelligence generation process showed to have three additional bottlenecks that have a big influence on current decision making quality.

First, validation is currently a concern mainly related to PMG and CPG decisions leading to unnecessary long discussions and flawed decision making. The main cause for the absence of this validation point is because decisions are frequently made with information that is in the head of people and is affected by people's emotions. Frequently, information that is in fact codified is validated in the sense that long time experience with the source of this kind of information resulted in trustworthiness of the source. However, although some strategic information sources are currently in use, a question is raised whether there are better sources that can be used. For instance, Company X biggest customer is a good party to use as key customer. However, whether he is in fact the right customer to use for key customer contact is not always questioned. Feedback can help here in reviewing whether the right information is then in fact attained and whether changes have to be made to this process. In sum, validation of codified information can help in creating trust in different information sources and reduce discussion time within the CPG and PMG meetings so better quality decision can be made.

Second, the level of codification needs to be improved related to information needs of both the CPG and PMG. Members in both decision making group experience lack of pieces of information that is typically only possessed by people that are in the business a long time. This usually results in a sudden jump in decision making which creates a gap in the decision making process and is typically unclear for the rest. Possible results of this is that one cannot judge whether decisions are in fact made based on information, either at hand or possessed in the minds of the decision makers, or that this decision is in fact made on a gut feeling where emotions can also play a role. This poses a problem, not only because the process becomes less insightful for others, but also because no proper feedback loop can be established about what information was truly missing in the process and take the proper actions to further close this gap.

Last, there is a low level of analysis within the CPG and PMG. Both groups have a monthly meeting planned in which all new information is discussed. Given the high amount of incoming material and the low level of analysis that were identified from the interviews, this can pose problems when decisions need to be made and all relevant facts need to be considered. Overviews combined with possible recommendations and conclusions that are linked to specific pieces of information and also link pieces of information together can provide great insight and limits discussions to areas that are still questionable instead of extensively going over all aspects. Although the ASM don't have to deal with the high amount of incoming material for their meetings, the analysis that are made for CPG and PMG purposes can also help them in spotting opportunities early on and helping them to gain a competitive advantage by taking early steps to prevent loss of orders. Therefore increasing the level of analysis within the PMG and CPG has the potential to influence both decision making quality and time.

5.1.3. Storage and centrality of information and intelligence needs

The absence of decent storage methods and central availability of information and intelligence needs are one of the biggest bottlenecks that are currently experienced across the three decision making groups.

First, storage of information usually happens on the department level which is frequently restricted to the people working there which prohibits the central access of information. With the ASM this is even more localized to their own computer on which they are building their own KIS systems. Because of the local storage of this information, decision makers find it very hard to find all needed information in this way which results in sub optimal decision making in the CPG and PMG meetings.

Second, centrality of information is also a big bottleneck that is experienced by members of each of the decision making groups. After all, the fact that information is missing at the time an important decision has to be made doesn't necessarily mean that such information is not available within the company. This might in fact be one of the reasons why the PMG is held with so many people to add missing information where necessary from all possible areas of expertise within the company. Dealing with this issue has the potential to increase the quality of the decision making on all levels of the organization while at the same time realizing considerable time savings.

Therefore, providing a central MIS system with specific input portals where information can be delivered, validated against other possible sources and then centrally stored can greatly contribute to the decision making process.

5.1.4. Effective intelligence usage by the three decision making groups

Key to the centralized system is that once the intelligence is centrally stored, decision makers can easily identify the intelligence that they need for decision making and can provide feedback about whether the generated intelligence was in fact useful or needs to be changed.

Analysis over the three groups showed that current identification is providing trouble and that feedback loops are mostly absent. As already explained, the identification of the proper intelligence is mostly caused by a lack of centrality and storage of information and a lack of codification of all relevant information. However, feedback loops are largely inactive in all three decision making groups which results in the fact that the system is not properly updated and that decision making quality is largely stayed the same over the years with no real improvements. Therefore, by properly establishing feedback loops related to the performance of the MIS the system can be updated regularly and keep functioning on the top of its performance.

5.2. Comparison between case studies

The academic goal of this research was stated as follow:

Contribute to the current literature and develop knowledge in the field of MO implementation, through the use of CIMO logic.

In order to address the first part of this academic goal: to contribute to the current literature, a comparison will be made between the case studies that have been performed thus far and this research related to MO implementation. The case studies that were identified during the literature study (Van Kesteren, 2012) being: Gebhardt et al. (2006) and Beverland and Lindgreen (2007) will be used here. Although this case study differs from the others since this study takes an information-process approach while the others take a cultural approach, three similarities could be identified that can possibly form the basis to combine both views in the process of creating a MO.

First, top management support is needed in both cases. As has been found by Gebhardt et al. (2006) top management support is a needed requirement to support the change process that is needed in the organization and to get the support of the people in the organization. This can be both true for cultural changes as well as information-process changes that need to be made when switching towards a MO. What became evident from the current research was that top management support was needed to be able to get around the table with the most important decision makers within the company, while at the same time being able to understate the importance of the need for a MO. Also, when changes have to be implemented, either ICT related or process related, these can never be realized without the top management support, since these changes usually need approval from the top. Therefore, top management is needed to signify the importance, being able to identify gaps, and make changes accordingly, while at the same time initializing a cultural shift.

Second, support for the switch towards a MO must be realized. Both Beverland and Lindgreen (2007) and Gebhardt et al. (2006) accentuated the need for a critical mass of support when changing towards a MO. What became evident from earlier attempts of Company X, and which was again stipulated by the current research, was that simply implementing a new system and change the current way of working will not work. When there is no support among the people working in the organization, who have to contribute to and work with the system in place, there will be no understanding of the benefits which the new way of working has to offer. This frequently coincides with resistance to change and sticking with the way of working that was used before. The consequence of that will be a waste of money in labor hours and cost of changing to a system that will never be used.

Last, a (strategic) action plan can be used as a fundamental basis to successfully guide the implementation process and realize the common goal. As has been pointed out by Beverland and Lindgreen (2007) as well as Gebhardt et al. (2006) a strategic action plan is needed since there are many factors involved with this switch that need careful coordination and must be viewed in the broader view to accomplish the common goal. This view is supported by this study since the implementation of a MO from an information-process view extend beyond the closure of the information gaps in solving process related bottlenecks as well as transfer issues that might be influential in the decision making process. This not only requires employees to contribute to the knowledge of the organization, but also requires new ways of working which frequently involves new tools and systems that need to be learned again.

5.3.   Conclusions

5.3.1.   Conclusions related to the comparison between cases of Company X

The market intelligence function can best add value by assisting in closing the gaps in the identified information needs and bottlenecks, updating these gaps on a regular basis and providing the proper tools to be able to easier share, analyze, and make full use of the available information so decision makers can respond quickly by taking the correct course of action. The following analysis could be identified as useful concerning the needs proposed by different decision makers on both the strategic and the operation level, together with the sources that are currently used for information collection (see figure 8).

SAP	Market intelligence	Customer intelligence	Competitor intelligence	Technological intelligence	Rules and regulations
Strategic intelligence	- Trend analyses related to macro indicators - Market analysis related to different market segments and making a priority based on potential and how this is most likely going to shift in the next years.	- Geographic customer analysis, enabling correct and good product market combinations. - Customer needs analysis, understanding both latent unexpressed customer needs and expressed customer needs and translating them in the right customer view.	- SWOT/ Porter's five forces analysis of competitors related to long term developments, active in which markets, focus on multinationals, local and niche competitors. - Partnership opportunities	- Analysis related to disruptive technologies. - Where is the current knowledge related to technology (possible partnership or information exchange). - Patent infringement related to technology of Company X and competitors.	- Analysis of what pending changes in rules and regulations means for Company X and its customers. - Gather info about with whom to lobby to soften pending rules and regulations (e.g. Brussel).
Operational intelligence	- Processing costs per geographic area and related opportunities. - Mergers and acquisitions and related implications. - Consumer behavior per geographic area and related implications.	- Clear overview of Company X customers, Competitor customers, and new customers and their current installation and possible investment opportunities. - Opportunities how to break in.	Operational SWOT analysis related to what is the competition going/able to offer, how is the competition going to offer, price/ quality	- End of life analysis - Performance analyis of current equipment of Company X and Competitors.	- Relevant rules and regulations per country and implications for machinery.
Critical succes factors	- Relationship building with relevant parties (e.g. Rabobank, customer's customers, etc.). - Communicating all relevant information from the field to the organization using standardized tools. - Sufficient internet scanning activity.	- Building relationships with the right key customers and customer's customers for relevant segments. - Standardized reporting methods - Identification and codification of all customers and their respective installed base.	- Central location for combining different views - Central availability of data - Sufficient analysis of consequences for Company X	- Relationship building with technological institutes. - Regular scanning of internet and relevant publications.	- Being connected with political members. - Deducting implications for Company X.

Figure 8 - Contribution of MI related to analyzing information

Also, the intelligence generation, dissemination and use process related to the building of a MIS for a proper MO are still in need for a lot of change. Especially the central availability is currently causing the most trouble for good decision making. The current system is mainly aimed at easing the gathering of information for own purposes then information generation for company wide use. Changing this would be a huge step in the right direction for Company X and would enable the individual decision making groups to operate much more effective than is currently the case. Therefore, solutions should be designed in this direction to aim for a more central availability of intelligence which is supported by good quality information generation, validating, analyzing and storing process in order to use the provided intelligence successfully and provide ways in which this system is kept up to date.

5.3.2. Conclusions related to the comparison of results with prior research

A comparison was made between the case studies that have been performed thus far and this research related to MO implementation. This will be done, as stated earlier, by generating design principles using CIMO logic. CIMO logic states that in a given context (C), by applying a certain intervention (I), that will work through mechanism (M), will achieve outcome (O). Three factors were identified that were recognized as being important for the cultural as well as the information process side of MO implementation. When taking a closer look at the three factors involved, it became clear that the reason why these three factors showed to be effective in both situations could be related to the combined mechanism that they all possess. Top management support, creating a critical mass of support and understanding, and a proper action plan all work through the creation of an overall alignment of the company towards a common goal. Without these factors the implementation of a MO is most likely not going to work. This results in the following design principle:

*When implementing a market orientation in a multinational company **(C)**, use top management support, creating a critical mass of support and understanding, and make a proper action plan containing both*

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*information centered and cultural centered actions **(I)**, through the alignment of the company towards a common goal **(M)**, to combine both cultural and information-process views and create a successful market orientation within the company **(O)**.*

The design principle as stated here is the result of the current case study and the few studies that have been aimed at implementing a MO in practice (Gebhardt et al., 2006; Beverland and Lindgreen, 2007). Since this research could therefore not build on an extensive knowledge in this field, the above mentioned design principle must be further validated in practice.

Of course both views also have plenty of areas where the differences are numerous. To address these differences and look into the second part of the academic goal of this study: to develop knowledge in the field of MO implementation, theoretical implications of the current study will be given in chapter seven with the accompanying design principles.

6. Redesign

In this chapter the directions for redesign will be discussed that will be guided by the design specifications and setting of the design parameters as will be described beforehand. Finally, design solutions will be provided which will include recommendations about the proper course of action to proceed. Here we will try to find an answer to the practical goal as was described in chapter three:

"Improve the quality of decision making by designing ways in which external information can be used as optimal as possible with the use of the newly established market intelligence position."

Therefore, the design solutions will be primarily aimed at improving the information related gaps that were discovered in the previous chapters.

6.1. Defining the design requirements for Company X

The design specifications form the basis upon which the design parameters can be set (see table 3). Van Aken et al. (2007) distinguish four categories of design specifications: (1) functional requirements, (2) User requirements, (3) Boundary conditions, and (4) design restrictions. While the first two categories are mostly self-explanatory, the third and fourth category differ in the sense that the former specifies points that must be met unconditionally, while the latter mentions points that are highly preferable. These four categories will be addressed next and related to Company X, after which the design parameters can be set.

Category	Design requirements
Functional requirements	• The design should signify the benefits of a MO to promote the adoption. • The design should increase the needed information generation and dissemination within the company. • The design should lead to a higher responsiveness towards changes in the external environment.
User requirements	• The design should be easy to use. • The design should not require too much time and effort to participate in information sharing. • The design should not require too much effort and time to retrieve information. • The design should increase the centrality of information available.
Boundary conditions	• The design should be applicable to different organizational layers within Company X. • The design should match the right information with target stakeholders, and thus must support restricted access for users.
Design restrictions	• The cost of the design should be in line with the performance increase that will most likely be realized. • The design should make use of the current ICT systems, new applications will not be implemented until 2014.

Table 3 - Design requirements related to Company X Setting the design parameters

The design specifications will here be used to identify the relevant parameter settings. As has been found in the literature study (Van Kesteren, 2012) the information-process oriented view on MO implementation consists of three parts which will become ongoing activities once implemented. First intelligence generation is needed to be able to get all relevant information within the reach of the company. Important here are the identification, validation, analysis, and storage possibilities which must be supported by the design to be able to reach the maximum level of MO. After all, decision makers do not benefit from getting entire reports as input. Key is to identify the right information, provide an indication of reliability and validate this information where possible, transform this information into intelligence by creating short and concise output with the use of a thorough (human) analysis, and store this intelligence centrally. Second, the mode of transfer determines how this intelligence will flow from the source to the recipient within the organization, which determines how easy it will be to get the right information to the right decision makers. Last, the usage of intelligence is determined by the ability to identify the right intelligence for decision making by being aware of the location to look for this and being able to easily retrieve this intelligence once located. Also, ways must be available to provide feedback so the content can be updated. This leads to the following design parameters and their value (see table 4).

Redesign direction	Design parameters	Parameter setting
Intelligence generation	Identification	People participate in identification of new external information both related and unrelated to their own problem and must be able to provide both.
	Validation	Conflicting views should become obvious and a validation step must be done before entering the intelligence in the system so people are able to trust the information or have an indication of validity.
	Analysis	It must be possible to create links between the pieces of information to enable people to provide deeper insight and increase the level of analysis.
	Storage	Intelligence should be centrally available and easily stored by the source.
Intelligence dissemination	Mode of transfer	Intelligence must be shared via either a computer (codified) or face to face (uncodified).
Intelligence use	Identification	People must be aware of the location and availability of different pieces of intelligence and have a central place to look for decision related intelligence first. Also the intelligence must be easily retrievable by the recipient.
	Feedback	Ways must be provided that support the feedback of availability, quality and accessibility of the intelligence.

Table 4 - Determining the design parameters and setting their value

6.2. Directions for redesign

Based on these parameter settings, solution directions for redesign will be suggested. The solutions will be related to specific parts of the redesign direction and parameters that are addressed, after which a

combination will be made among the solutions that best meet the design specifications as has been set previously. The solution directions are the result of a brainstorm session and a scan of the literature.

Solution 1: Organizational Wiki

A wiki is generally defined as "a democratic, accessible community of users responsible for its own content, supported by an open model of knowledge creation and communication." (Grace, 2009). Wiki's generally rely on the motivation of people to contribute to the system, and therefore build on social exchange theory and intellectual capital theory (Yates et al., 2010), where the key point is that people contribute because of the expectancy to improve organizational processes among other things. Therefore, wikis have the potential to serve as a central spot for Company X to gather and store external information, create linkages among the information and provide the proper basis for analysis by creating better insight. Since information is currently coming from a high variety of sources, a wiki would create a good environment where people can easily store information at the right places, can create links between the information, and correct each other where needed. Also, creating measures of validation can be easily accomplished by publishing the writers name with the information and providing the source where the information came from. Company X can then appoint people with a certain area of expertise and a good overview within the organization to guard the contents of the wiki and make changes and linkages where necessary to prevent the process from quickly becoming unwieldy. Because of the ease of use, quick overview and central place of information storage, the benefits of using this system would be easily communicated and understood.

Solution 2: Rewards

Rewards are closely linked with the motivation of people to engage in behavior that is considered as positive by the organization. Osterloh and Frey (2005) state that people are extrinsically motivated when they are able to satisfy their needs indirectly, especially through monetary compensation. Properly aligning everyone to a common goal and making them see the benefits of a MO, while at the same time aligning the reward structure with market oriented behavior that is needed, can result in good identification of the relevant intelligence that is available in the external environment and capturing this effectively. The current culture of Company X is in line with the organizational goals of Company X. There is a high level of unity among the different sales departments of Company X and people help each other where possible. This is combined with an atmosphere in which hard work and social activities are encouraged. Therefore, people will most likely participate in the switch towards a MO when they see the benefits for them and the organization. However, the current reward system is specifically aimed at accomplishing a certain sales target, while in the new situation contributing to the intelligence system could be encouraged by the proper rewards and would be more in line with the organizational goal.

Solution 3: Training

In order to enable employees to accept and deal with the new way of working, training sessions can contribute to let everyone see the benefits that can be attained with a MO and creating a critical mass of support that is needed to make the switch. Also, training can help in learning how to contribute to the MO as a whole and how to work with the new system. Especially the accentuation of the ongoing activities and the feedback that is needed from everyone to keep the system operational and at a high

level of usefulness must be understood by everyone. Therefore, training can be a useful tool both in the beginning to educate people related to the switch that is going to be made, and contribute to the operational requirements related to the intelligence system.

Solution 4: forum
One level down from wiki's is a forum that can be used to share and store information in a central spot. The benefits of a forum compared to a wiki is that a forum is much easier implemented within the existing structures of a company and can, in most cases, easily be created and accessed through the use of the companies intranet facilities. Downside of such a forum is that the authorship of a message usually lies with the creator of the message and can't be edited by other users. Also, creating linkages within a forum can be much more cumbersome. Therefore, a forum is generally more useful when more operational and general information is shared that does not necessarily require deeper insight and a higher level of analysis. It would therefore be a viable solution to be used by the ASM who need to share operational information and general presentations to be used for approaching the customer. Furthermore, a shared forum would increase the awareness of tools that can be handy to use or information that is relevant for their specific situation. With the current technology one is able to set update messages for certain parts of the forum they are interested in to be informed about new posts related to specific topics. In this way people don't need to visit the forum to check for new things but will receive a message when messages fall into their area of interest. Of course a forum is, just like Wikipedia, highly dependent on the contribution of the participants. This is however also the case with MO as a whole and should be supported by the appropriate cultural changes. Therefore, for sharing basic information among ASM, or other frontline employees, a forum would provide a good medium.

Solution 5: Market information system (MIS) combined with good input and output portals
As has been shown in the literature review (Van Kesteren, 2012) a market information system has a positive effect on the MO – performance link. Wei and Wang (2011) state that "an effective market information system acquires, sorts, and classifies information and can simplify and share information to reveal coherent patterns. It is a strategic resource in that it provides managers with the information they need to relate to the external environment." (p. 268). However, such a system needs to be supported by the right ICT tools, which can be very costly if they cannot be supported by the technology that is already in place. Currently Company X uses SAP, which can be used to support a MO and create the needed linkages between information for deeper insight and create a higher responsiveness within the organization. Important here is to support the ongoing generation of market intelligence through collecting the right information and updating this in accordance with the dynamic playing field in which the organization operates. Creating a proper overview and validating the information is very important, and people are frequently not able to update all information themselves. Therefore, a proper portal needs to be created where information can be send to, further analyzed, validated against what is currently known, and entered into the system. Decision makers then need to check the proper output portal to support them in their decision making. Because the information/intelligence stream is controlled in this way it is easier to prevent the system from becoming unwieldy, maintain the quality of the system and accompanying output, and provide clarity towards the stakeholders. Important here to remember is that these input portals then become a bottleneck of the system in which one has to

prevent information overflow by correctly estimating needed capacity and being able to organize the process and act on the potential importance of the provided input. Therefore, the use of a proper MIS would increase the level of codification and centrality of Company X.

Solution 6: Providing structured documents for reporting
Besides the need to have everyone participating in intelligence generation, it is also a requirement for people to know what is expected of them. By providing structured documents that provide a clear picture what kind of information is expected of people, consistency is build among the information that is collected, which increases the ease of adding information to the system since it all goes via the same format. Currently, frontline employees already have a format about what to report during, for instance, customer visits. These reports should be reviewed to see whether they comply with the need that exists within the company.

Solution 7: After action review
Reflecting on past action can be a way of learning to optimize the current way of working. Busby (1999) state that an after action review relates to the systematic review of people to reflect on recently completed projects in order to learn from the experience of having done it. A key problem, as has been found in the study by Busby (1999), is that people mainly focus on the process itself instead of the outcomes of the project. The after action review can help in the CPG and PMG meetings to see how the process went and what still needs to be improved, and how big the information gaps still are also related to the outcomes of the decisions that are made related to both innovative and commercial perspective. By planning this activity, for instance, once or twice a year, can help in keeping a close watch on the current level of MO and what needs to be improved.

Solution 8: Knowledge map
Driessen et al. (2007) argue that knowledge mapping aims to "optimize the effective and efficient use of the corporate knowledge base by addressing the question how to best support finding the knowledge and building insight into the qualities of this knowledge." (p. 110). Given this definition, it is obvious that knowledge mapping serves as a tool for the first steps towards a MO. With this a clear picture can be attained about what knowledge is available within the organization and see where more focus needs to be, to get an even better understanding of the organization itself and the environment it is in. Since one of the main issues related to information usage for decision making was that people were not aware of the possession of that particular part of information, a knowledge map has the potential to solve this problem. Due to its function of pointing out where specific knowledge lays within the organization, it is frequently referred to in the literature as corporate yellow pages. Although this solution stretches the criteria for centrality in that it in fact doesn't centralize information itself, but provides a central tool with which information can be found, it can be seen as a solution for, for instance, information related to rules and regulations. Only a limited amount of people are dealing with generating this kind of information and a knowledge map would therefore provide a good and central spot for how to acquire this kind of information.

These solutions can then again be checked against the relevant parameters and the restrictions that were established in the beginning of this chapter. This leads to the following result (see table 5).

Solution direction	Relevant design parameter	Violation of restrictions
Organizational Wiki	Validation Analysis Storage Mode of transfer Identification (Use)	Current ICT Cost (possibly)
Rewards	Identification (generation)	
Training	Identification (generation) Analysis Storage Identification (Use) Feedback	
Forum	Storage Mode of transfer Identification (Use)	Applicable to multiple layers in organization
Market information system	Validation Analysis Storage Mode of transfer Identification (Use)	Cost (possibly)
Structured documents	Identification (generation)	Time requirement (possibly)
After action review	Feedback	
Knowledge map	Identification (Use)	Centrality (minor)

Table 5 - Determining the influence of the solution direction on the relevant design parameters and violations of restrictions set

After reviewing the solution directions and the relevant parameters and restrictions, all solutions can be combined with the exception of the wiki and market information system which are two solutions to the same problem: providing a tool for centralizing information and supporting people during most of the information process. Since an organizational wiki would require an additional system besides the ones that are currently in place, a market information system that can be integrated within the current SAP system would be highly preferable and is therefore chosen as the better solution direction.

6.3. Detailed solution design

The following solution directions will now be worked out in more detail: The market information system, structured documents, after action review, and the knowledge map because they signify a good solution direction for Company X. On the other hand, the rewards, training and forum will not be further worked out. This because during the course of this research the solution direction related to a forum for the ASM was seen as a quick win which was easily implemented in the current intranet facilities and is currently up and running. Besides the forum, training and rewards are very specific solution directions that also heavily depend on management wishes and their vision and experience related to the best way of implementing these solutions. Therefore, these solutions will be left open for Company X's own interpretation and how to realize this. This leads to the following integrated solution design (see figure 9).
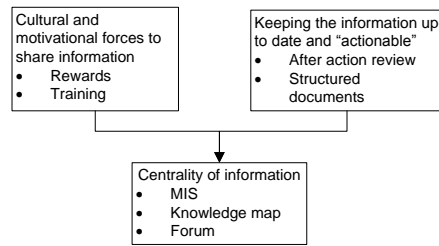
Cultural and motivational forces to share information
- Rewards
- Training

Keeping the information up to date and "actionable"
- After action review
- Structured documents

Centrality of information
- MIS
- Knowledge map
- Forum

Figure 9 - Integrated design solution

The market information system (see appendix K)

The structure of the market information system and the related process towards the decision maker impacts the quality and the reliability of the system and should consist of different steps. First, the market information system should support the needs and wants of decision makers. In this case these are the PMG, CPG and ASM who represent innovation, the commercial policy, and operational sales. Each of these groups have their own Key Performance Indicators (KPI's) and are dependable on the correct generation, dissemination, and use of market intelligence. For the correct generation, dissemination and use, corresponding Critical Success Factors (CSF) have been formulated that have been deducted from the literature review (Van Kesteren, 2012) and the interviews. Based on these interest groups, a certain decision maker has to make important strategic or operational decisions. Based on the proper models and data that is gathered from the external environment, analysis can be made to support this decision making. Models can be used in a wide range of situations and have, in most cases, shown their effectiveness. Examples of useful models might be: BCG-Matrix, Porters five forces and Pareto diagram. Each of the intelligence drivers should be supported in the intelligence system to create a good centrality of information. Based on the interviews, the various analysis and pieces of information were filled in that should support the current needs of decision makers. Sources to gather the required information were deduced from the interviews and the survey that were held in the beginning of this research. Based on these sources, and intelligence needs, CSF's were formulated to bring MO to a higher level for each market intelligence area. Sources should be named by each analysis to enable decision makers to judge reliability for themselves. Especially in the beginning, decision makers may take a critical stance towards the information supplied and while trust is gained over time, this extra information may be no longer necessary. Finally, the analysis out of the MIS should be brought to the decision maker via some kind of interface. This may either be in the form of a computer generated format when this information is accessed via a computer, or simply hard copy. Note however, that the information and analysis that are constructed via this way are heavily dependent on the codification of information. Tacit knowledge cannot be used here and should be communicated via face to face meetings to make sure this knowledge is also taken into account. However, this way of communicating is not represented in the figure since it is not part of the design solution. The current structure is based on the work of Heede (1994) and Kotler (2006) and adapted to Company X and represents a first proposal of how an MIS could be properly organized (see appendix K).

Structured documents

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After action review

The after action review can serve as a feedback mechanism in discovering where information is still lacking, looking for bottlenecks that influence the decision making process, and providing insight into the current way of decision making and information usage. To this end, an after action review document is created that is closely related to the minutes of the accompanying meeting (see below for an example related to the PMG). First, the decision logic focuses on the process behind the decisions and the related information analysis that were used as a basis. With this, emotions and belly feeling can be reduced and one can objectively find out where there is still information missing, and what the possible next steps thus need to be. Second, the consequences and responsibilities focus on the decisions that are made and the consequences of these decisions. By making the consequences of the decisions more insightful,

for instance for the PMG, the balance between short and long term innovation becomes much more insightful and can thus be easier guarded. Also, by appointing someone who is responsible one can create a point where questions can be asked and reduce decision making time in the PMG meetings considering the fact that this person can then sufficiently prepare to all possible aspect of the related decision. The second part of the review focuses more on updating the identified gaps in this research related to the five market intelligence areas and the bottlenecks that still affect the decision making process and thus influences the responsiveness of the decision makers. The contribution of the after action review is therefore twofold. First, one has a good understanding of which decisions are made, why, and the related consequences, which enables the organization to guard the key performance indicators related to the relevant decisions. Second, the after action review enables the organization to update the system based on regular feedback moments from the decision makers within Company X. Therefore, the proposed solution would give Company X a good insight into the chain of evidence and related consequences for decision making, while at the same time providing a good way to generate feedback based on the intelligence that is currently generated and disseminated.

After action review PMG

Main category: Long term innovations
Date: 01-01-12
Reference to Minutes: Minutes-PMG-01-01-12.docx.

Part 1: Decision making process and consequences:

Decision logic:

Decisions made	Short description	Reasoning	Related documents
Proceed to A phase of product X	New machine	*Old machine reaching end of life *New technological developments *Good indication of related product market combination	*Value proposition nr. Xxx *Customer analysis nr. Xxx. *Etc.
Etc.	Etc.	Etc.	Etc.

Consequences and responsibilities:

Decision:	Consequences:	Responsibility of:
Initiate A Phase	• R&D capacity needed • Budget needed • Etc.	

Part 2: Intelligence needs:

Main information gaps noticeable:

Market	Customer	Competitor	Technology	R + L
*Deeper knowledge required related to emerging markets (e.g. Brazil) and related segments.	* Detailed geographic information lacking related to geographical areas X, X and X	Etc.	Etc.	Etc.

Main bottlenecks experienced

Bottleneck	Short description

Detailed analysis required	More insight needed into consequences of new rules and regulations regarding X.

Knowledge map

The contribution of a knowledge map could be twofold. First, by indicating who is an expert related to a specific fields of knowledge. This provides a way in which information can be easily located, further explained, and specified to the problem at hand. Important here is that the knowledge map only contributes when the knowledge is highly centralized around one person, otherwise it would still require too much time and effort to acquire the needed information. Three topics that could be considered for a knowledge map that were discovered during the interviews are the following. First, rules and regulations can be split up in a few areas that are the main responsibility of one person. These areas related to ███ ███████████████████████ related issues which are mostly covered by █████████████████████ ████████████████████████████████ respectively. Given their expertise in this field a knowledge map can be applicable here. The second topic relates to the fact that each country has it specific requirements related to consumer requirements and what specific demands are set by the local culture. This information is currently known by people who have long time experience in the field and is currently centralized around the people of PTO and then especially ███████████. The last topic relate to the field of intellectual property for which Company X has a special department which is lead by ████ ████████████.

The second contribution of a knowledge map is mainly related to new people who have just started within Company X. They are frequently unaware of the above mentioned knowledge areas, since the pure knowledge about ████████████████ is mainly learned within Company X, but are also unaware of information initiative that are currently running. An example of this is the market update that is sent out to all people who subscribed to this email and relates to all relevant internet publications related to changes in the market, customers, competitors, technology and rules and regulations. This generally saves a lot of time for people to check all relevant sites themselves and can be relevant in all sorts of situations. However, new employees are not always aware of this and might not be introduced to the person responsible for these initiatives. By providing a knowledge map within the introduction map that every newcomer receives, this problem can be easily prevented and helps in both the information provision for employees as well as preventing the initiative holders to constantly keep track of new hires.

The design of the related knowledge map can be seen in figure 10. By providing logic and clear subject titles and sorting them alphabetically specific knowledge can be quickly located. By linking them to the organizational structure one can also get a sense of the bigger picture and encourages employees to interact with each other and build a network that extends beyond the boundaries of their own department, which is especially useful for knowledge that cannot be codified.

Knowledge map		
Topic	Knowledge holder	Location
Intellectual property	xxx	xxx
Interest groups	xxx	xxx
Market		
Market Intelligence	xxx	xxx
Newsletters		
Politics and law	xxx	xxx
Retail	xxx	xxx
Rules and regulations		
Scientific research	xxx	xxx
Supply chain	xxx	xxx
Trade Fairs	xxx	xxx
Trade Organizations	xxx	xxx

Figure 10 - Knowledge map for Company X

7. Reflection

7.1.   Theoretical implications

This section will focus the second part of the academic goal that was set in the beginning:

Contribute to the current literature and develop knowledge in the field of MO implementation, through the use of CIMO logic.

The current project provided insight into the implementation of a MO from an information centered view and these insight will be discussed here (see figure 11). This will be done using the three information centered actions related to MO. The design principles that are formulated in this section are considdered to be applicalbe to business to business companies in the high tech industry. For further explanation see the limitations and further research in chapter 8.
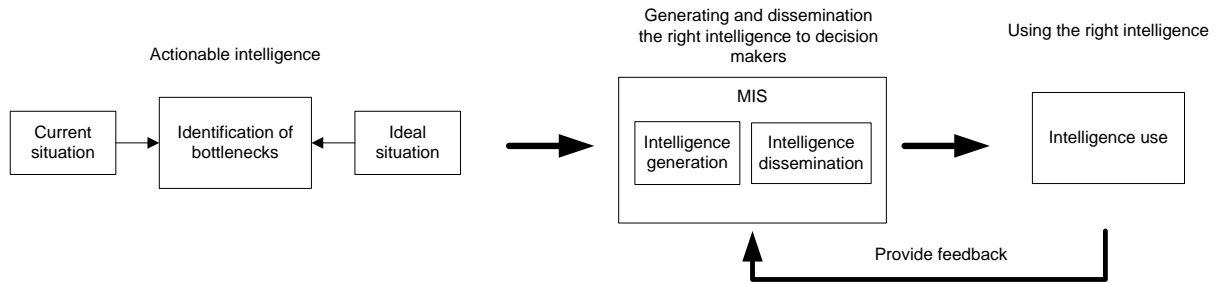

Figure 11 - Roadmap of MO implementation from a process oriented view

Each process step will now be discussed in more detail. First, the project provided insight into the implementation of an intelligence generation system. An overview of this is given in figure 12.
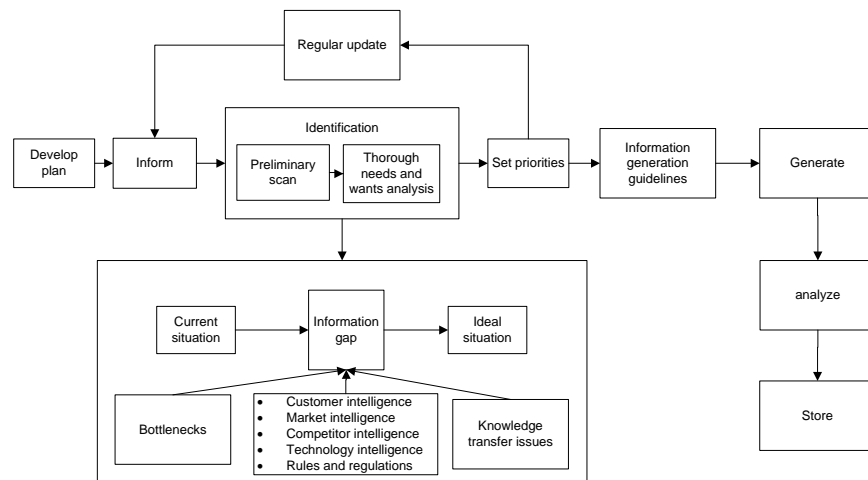

Figure 12 - The intelligence generation process

To begin with, the development of a proper action plan is needed to have a sense of direction and be able to inform and prepare the relevant parties for what is about to take place. Cooperation of all decision makers is needed to sufficiently map the needs and wants of the decision makers and thus

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where the future intelligence generation should be aimed at. Rodenberg and Tillman (2012) suggested the use of interviews to identify these gaps and use the five intelligence areas as a basis. This view was confirmed with the current study together with the need to identify process bottlenecks to smooth decision making, and knowledge transfer issues to minimize the loss of knowledge when transferring it from the source to the recipient. Based on the identified gaps, one can see where the most added value can be delivered and set priorities accordingly, after which the strategic plan can be further updated with milestones etc. Then after the right priorities have been set, information can be gathered, analyzed and stored for further use. By performing regular updates on these gaps, one can notice in time whether priorities have changed or when new gaps have been identified. This leads to the following design principles.

When implementing a MO system aimed at generating market intelligence (C), develop a strategic plan (I), because it helps in the alignment of all stakeholders (M), to reach the goal that is set by the organization (O).

When implementing a MO system aimed at generating market intelligence (C), use semi-structured interviews (I), through the understanding of the drivers of decision makers in the company (M), to prevent the collection of unnecessary information and focus on direct short and long term needs (O).

When identifying the information gaps that currently exists among decision makers (C), focus at the five intelligence areas (customer, market, competitor, technology, and rules and regulations), process bottlenecks, and knowledge transfer issues (I), through the understanding of issues influencing the decision making of the deciders that can be changed (M), to identify the size of the information gap that exists to date (O).

When setting priorities for further action (C), use the size of the identified gaps and its effect on decision making (I), through the understanding of added value of market intelligence to the organization (M), to identify the tasks that should be worked on first and being able to update the developed plan with relevant milestones (O).

When an intelligence generation system has become active in a company (C), perform regular updates related to the identification of the gaps (I), through the understanding of changing decision maker needs and adaption to the changing environment (M), in order to keep generating the proper intelligence for decision makers (O).

Second, a proper system must be set up for disseminating the relevant intelligence across the organization and towards the proper decision makers. An overview of this process is given in figure 13.
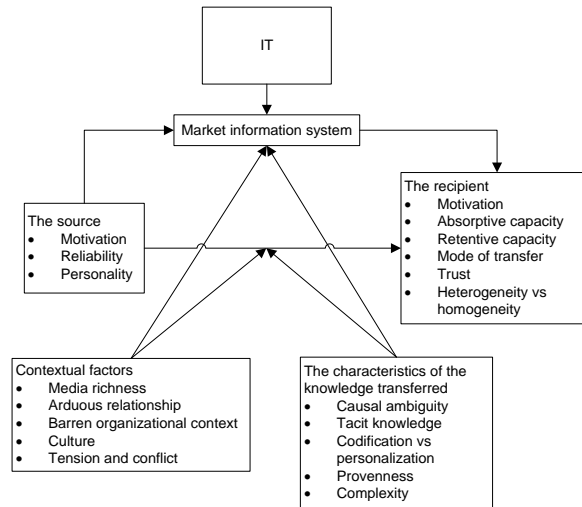
Figure 13 - The intelligence dissemination process

The knowledge transfer issues that have been identified in the previous phase during the interviews can influence the amount of knowledge that is successfully transferred from the source to the recipient. As identified from the literature study (Van Kesteren, 2012) and this research project, an MIS can have a positive effect on this by providing a central source where information can be stored and found and has a positive on the responsiveness of the company as well (e.g. Wei and Wang, 2012; Trainor et al., 2011). However, an MIS is highly dependent on the codification of knowledge transfer. For that reason direct face to face meetings must be in place for transferring non-codified knowledge that has to be considered in decision making. This leads to the following design principle.

*When implementing a MO system aimed at disseminating market intelligence **(C)**, make use of both an MIS and IT tools, like SAP, and face to face meetings **(I)**, through successful knowledge transfer **(M)**, to be able to make decisions based on all available knowledge within the company.*

Finally, the use of intelligence and strategic actions that result from it must be implemented in a process to be able to get sufficient feedback about how the current level of intelligence is supporting the decision making and update it accordingly. An overview of this process can be seen in figure 14.
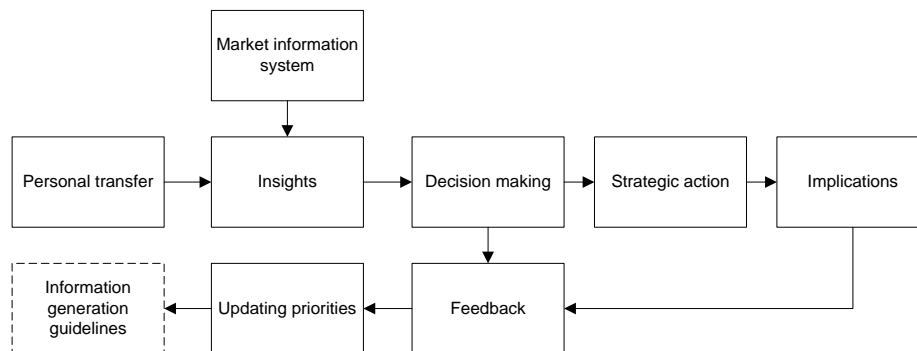

Figure 14 - The intelligence use process

Insights provide the basis on which decisions are made. These insights may either be given by the MIS that is in place or deducted from the information provided through face to face meetings. Based on the decisions, strategic actions are planned which lead to certain implications. Based on both the implications as well as the decision making itself, feedback can be given about what information was missing, after which the related gaps and priorities can be updated. The literature and the internal discussion showed that the after action review, structured documents, regular face to face interviews, and studying the implications could provide a viable way in documenting the feedback that is necessary for keeping the intelligence system up on track. This leads to the following design principle.

When implementing a MO system aimed at the use of market intelligence (C), make use of after action reviews, structured documents, regular semi-structured face to face meetings, and studying the implications of strategic actions (I), through understanding of the current situation of decision makers (M), to acquire regular feedback about the size of the information gap and update priorities and tasks accordingly (O).

7.2. Recommendations for further action

The current study was primarily aimed at the sales and NPD side of innovation, to discover gaps, bottlenecks and related issues that are influencing the current level of MO within Company X. Although this research provide a good initial step towards reaching a higher level of MO, many steps still need to be taken to get to the highest level. As stated by Kohli and Jaworski (1990) the term market intelligence is much more appropriate than marketing intelligence because generating, disseminating and using market intelligence should not be the primary concern for the marketing department. It takes all departments to work together in an effort to collect, analyze and store all required information needed for internal decision making. Recommendations for further action are therefore as follow (see figure 15).

Short term actions
- Develop strategic plan for market intelligence, including both information centered as well as cultural centered actions.
- Determine cultural awareness and what still needs to be improved and develop ways to increase the understanding for a need for market orientated behavior.
- Start with the mapping of needs and wants of other departments within Company X
- Consider implementation of short term design solutions

Medium term actions
- Finish mapping the needs and wants of other departments within the company and update strategic plan accordingly.
- Update short term design solutions for Company X based on new insights.
- Create cultural awareness in the business unit and start training and workshops to increase understanding.
- Consider the implementation of proper IT tools to support intelligence generation, dissemination, and use.

Long term actions
- Implementation of proper IT tools to support intelligence generation, dissemination, and use.
- Consider organizationwide implementation of market intelligence and linking the systems together to increase the unity within the organization and take a first step into decreasing the inter-organizational boundaries
- Create organization wide cultural awareness

- Continuous effort to close current information gaps and process related issues
- Regular effort to identify the size of the information gaps and find new ways of closing them.

Figure 15 - Recommendations for further action

The first action that is recommended is to develop a strategic plan that contains several milestones for the goal that the organization wants to reach. The first steps in this process are already taken and this plan could be updated with the current results. Since, for this research, the primary focus was the sales departments, other departments within Company X need to be further investigated about their needs,

wants, priorities and related decision making. When all needs and wants are sufficiently mapped, further actions may be taken into finding ways to closing the identified gaps and solving the bottlenecks and issues that have an impact on the operational and strategic decisions that need to be made. Although the closing of the gaps should also be a priority for the intelligence function, solving the identified process bottlenecks lay foremost with the decision making units themselves and their respective managers. In the previous chapter some design solutions were given into closing the related gaps that were identified during this study and need to be considered for implementation. A knowledge map is relatively easily created and has the potential to positively influence the low degree of centrality that is currently experienced by several decision makers. Also, the after action review and the structured documents can be implemented with relative ease. After mapping the information gaps across Company X, thought must be given into whether to implement a market information system and whether this would still fit with the organizational goals. The literature showed that implementing the right IT tools, such as a MIS, has a positive effect on the responsiveness of the organization and contributes positively to the time to market of the company and the related concept of NPD success (e.g. Wei and Wang, 2011; Haverila and Ashill, 2011). Currently, Company X is implementing a CRM system that is going live by starting at several test locations before implementing it companywide. This might also be an option for the MIS system that could be implemented in the future, to deal with implementation issues on a much smaller scale and enable a smoother implementation in other parts of the organization. While the information gaps are currently mapped for the sales organization, this is likely going to shift in the future when actions are taken to close these gaps. After all, the ever changing environment can change the size of these gaps considerably. Therefore it is of critical importance that these information needs are checked on a regular basis. Also, future steps should be aimed at considering the implementation of a MO across company which has the potential to lower the organizational boundaries between industry centers.

Furthermore, although this entire research has focused on the information centered view of MO, one must not forget that the implementation of a MO can't be done without the thorough consideration of the cultural issues that are frequently involved. The best roadmap identified from the literature for implementing this view was given by Gebhardt et al. (2006) (see figure 16).
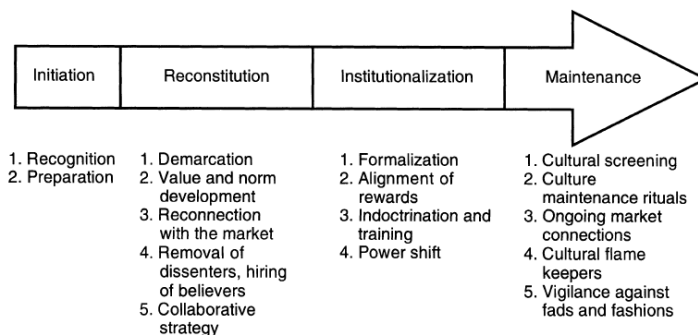

Figure 16 - Culture oriented roadmap towards market orientation

They distinguish four separate phases in which the first is aimed at developing a plan and goals for the future and creating initial support, the second is about developing the right norms and values that

belong to being market oriented, third the alignment of the structure and the systems towards the newly developed norms and values, and fourth guarding the maintenance of the established culture and guard for deviations to the goal set in the initial plan. Although the current research was not aimed at this view of MO, it was experienced during the interviews that especially with the area sales managers the culture indeed needs to shift to align them more to the values and norms aimed at generating and disseminating the proper intelligence. Information from the field is very valuable for a MO and the front line employees of the company are one of the main sources to get this information into the company and towards the right sources. Although initial awareness sessions already have taken place, proper training and setting of rewards is most likely needed to unlearn traditional ways of working and switch to a way of working that is more aligned with the new organizational goals. Therefore, when making a long term plan for the implementation of a MO, cultural milestones should not be forgotten and should be set together with the actions related to the information centered view as described above.

8. Conclusions

8.1. Contributions

The contribution of this research is in line with the academic goal that was set in the beginning of this report:

"Contribute to the current literature and develop knowledge in the field of MO implementation, through the use of CIMO logic."

The contributions that follow from this academic goal were twofold.

First, a contribution of this study is that this study was design oriented, meaning that special attention was focused on coming to solutions to help other designers deal with similar issues. From the literature review (Van Kesteren, 2012) it became clear that although research had reached the conclusion that a market orientation would be beneficial for companies, not many ways were provided for practitioners to actually reach this goal. The redesign suggestions given in this report provide a first step into helping other companies deal with similar issues in the field of market orientation implementation.

Second, this study is among the first who specifically focus on the implementation of a MO in a company who specifically focus on developing a framework for the process oriented side of MO implementation. Other scholars who have focused on this area were identified such as Gebhardt et al. (2006) and Beverland and Lindgreen (2007) who concluded that a change in organizational culture is essential for the successful introduction and operationalization of a market orientation. This study, on the other hand, made the first step into discovering the process related steps that need to be taken to get the intelligence generation, dissemination and use operational within the company. Concerning the intelligence generation process, Rodenberg and Tillman (2012) suggested the use of interviews to determine the needs of decision makers. The current study took this one step further by not only focusing on the needs and wants of decision makers, but also making the potential bottlenecks and transfer issues insightful that may hamper a successful intelligence generation process. Moreover, this study concluded that the process of identification of needs for relevant decision makers needed to be of a repetitive nature, given the fact that along with environmental change comes the need of decision makers for different kinds of intelligence. Furthermore, the use of a strategic plan was stipulated by Gebhardt et al. (2006) as well as Beverland and Lindgreen (2007). The present study accentuated this need again, which provides a good initial step to combine both the process oriented and the cultural oriented way of MO implementation. Concerning the intelligence dissemination process, the moderating role of IT and then especially a proper and well organized MIS was shown. However, IT is not the self-fulfilling answer to all dissemination problems. Human input is needed to get the information in and guard the quality of this information. IT is merely a tool that can positively influence the dissemination process related to codified information. Information that is not codified or is in fact tacit, still needs to be transferred from the source to the recipient. Related to the use of market intelligence, collecting specific "actionable intelligence" aimed at creating insight for specific problems prevent the system from becoming unwieldy and merely collecting information that is not used. Although this fact was already known in the literature, solutions in the form of after action reviews, structured documents & face to

face meetings, and studying the implications of strategic actions showed to be ways that can help in providing decision makers with the right information, so they can use the market intelligence when and wherever they need it. This resulted in one of the first frameworks, known by the author, which specifically focus at the implementation of a market orientation from a process oriented perspective.

8.2. Limitations and further research

The limitations of the current research are twofold. First, although the current research attempts to fill the gap identified in the literature related to the absence of studies focused at the information centered view of MO, the study heavily relies on a case study which contains only one case: Company X. Even though this is a limitation of this research, the author believes that the results of the current research can be generalized to a larger population of multinational business to business companies in a technical industry. While the problems and gaps identified are primarily related to Company X, the steps taken to identify these problems were carefully documented and explained, which contributes to the external validity of this research. Therefore the roadmap developed in section 7.2 could be applicable to other multinational business to business companies in the high tech industry as well. Future research should be aimed at validating this framework and the related designs propositions and expend the current framework where necessary. Second, the current study only spans six months, in which I was able to experience only the initial steps towards an information centered view of MO. Future research should be aimed at studying companies at different phases of this implementation process to be able to further elaborate and validate the framework that was established in section 7.2.

Also, further research should be aimed at studying both cultural and information centered view of MO implementation in a wide variety of contexts. Current research has been relatively limited on this subject, with a few case study exceptions, and should be further elaborated upon given the increasing popularity of becoming market oriented across practitioners. Given the current struggle of those organizations to correctly implement both views the need for the elaboration of further knowledge in this field seems grounded.

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Appendices

Appendix A Detailed problem statement

Based on Van Aken (2007), the problem mess will be introduced here, leading to a preliminary cause and effect diagram which will give an easy overview of the problem and the relevant cause that are relevant in this case. The problem mess also sets an important demarcation of what will be assessed as relevant in this research project and what is left outside the current scope.

First, the market of Company X used to be central in Western Europe, however emerging markets in China, India and Brazil expanded the geographical range considerably. With this expanding geographical range the importance of a central intelligence system increased, given the fact that market information wasn't as central as it used to be. Increasing amounts of time are needed to gather all relevant information from all relevant parties for decision making. Furthermore, the vast amount of data available is very large, which, if people needed to read all of this, would take them a life time to process. Due to internet and other channels of information, information gathering itself might not always be the problem, but being able to process and analyze all relevant information and conclusions from these reports, news items etc, can cost vast amount of time, which is reducing the time that can be spend on innovation, helping and serving customers or coming up with strategic ways of doing business. Also due to the work pressure, priorities have to be set in which the gathering of additional external information is not always high on the list.

Also, Company X is currently in a growth phase and is expanding rapidly, with so many people and different departments all over the world, informal methods of information sharing by telephone, mail or direct contact showed to be highly inefficient. This due to time differences, de-centralized information etc.

From this backbone, all the innovation initiatives and strategic decision making, which will guide the organization in the future, is taken. Therefore, these decision makers are the main stakeholders behind the request for a central market intelligence system. The information, also called market intelligence, for these groups are coming from departments different departments, who not only need to provide the strategic information for these groups, but also need this intelligence for their own operational decision making.

This intelligence can be provided in several ways. External data needs to be collected, which can come in different forms (e.g. reports, observations, hearsay). This data is always externally driven and provided/produced by human input. To be able to use this data, one has first to be sure that the following things are checked: pertinence, reliability and validity of the data. The pertinence determines whether the data gathered is relevant for the company, whether it is needed immediately and, when this is the case, by whom it is needed. Next, the reliability of the source is determined. Reliability usually comes with experience from working with the source, and thus builds up over time. Finally, validity is concerned with the truth of the data itself. This can be assessed by comparison with data from other sources and searching for associated indicators (Montgomery & Weinberg, 1979). Given this process and

the fact that external information is not always easy to come by, gathering sufficient external information for decision making is a time consuming activity.

Once this data is approved it can actually be transformed into intelligence. Depending on the sort of data delivered, this can be done by means of several techniques like pattern recognition or analysis. Once this is done it can be disseminated to the appropriate people, who in turn can use it for their daily activities. When we refer to information or intelligence, this sort of transformed data is meant.

Therefore, following all those steps to be able to support the relevant strategic decisions that need to be made, is a great responsibility that is currently not supported with a central point where external information can be accessed, making it an unnecessary long process. Company X wants to find a balance between centrality of information and vulnerability. After all, when information is too dispersed, as is currently the case, the effort to obtain the useful information is a hurdle for some people, leading to ungrounded decision making. Also, Company X operates according to the operational excellence strategy as defined by Treacy & Wiersema (1995), with this in mind; Company X wants to have its sales people positioned in the market as so called ▮▮▮▮▮▮▮▮▮▮▮. By this we mean that they are informed about the latest trends and developments in the market, basically being the market intelligence system for its customers, so when customers want to know what these latest trend are they automatically turn to Company X for advice.

Last, although information might be available within the organization, there is no knowledge about who needs what kind of information and why. Therefore, the people who posses this information have no knowledge of the need of other, which inhibit them to send it further to all relevant parties.

This problem mess resulted in the preliminary cause and effect diagram (see below). Given the fact that the current state of affairs is becoming highly unsatisfactory, the problem statement can be defined as:

The way in which external information gathering is done in the current situation is highly unsatisfactory due the high levels of inefficiency, leading to a lower rate of performance.
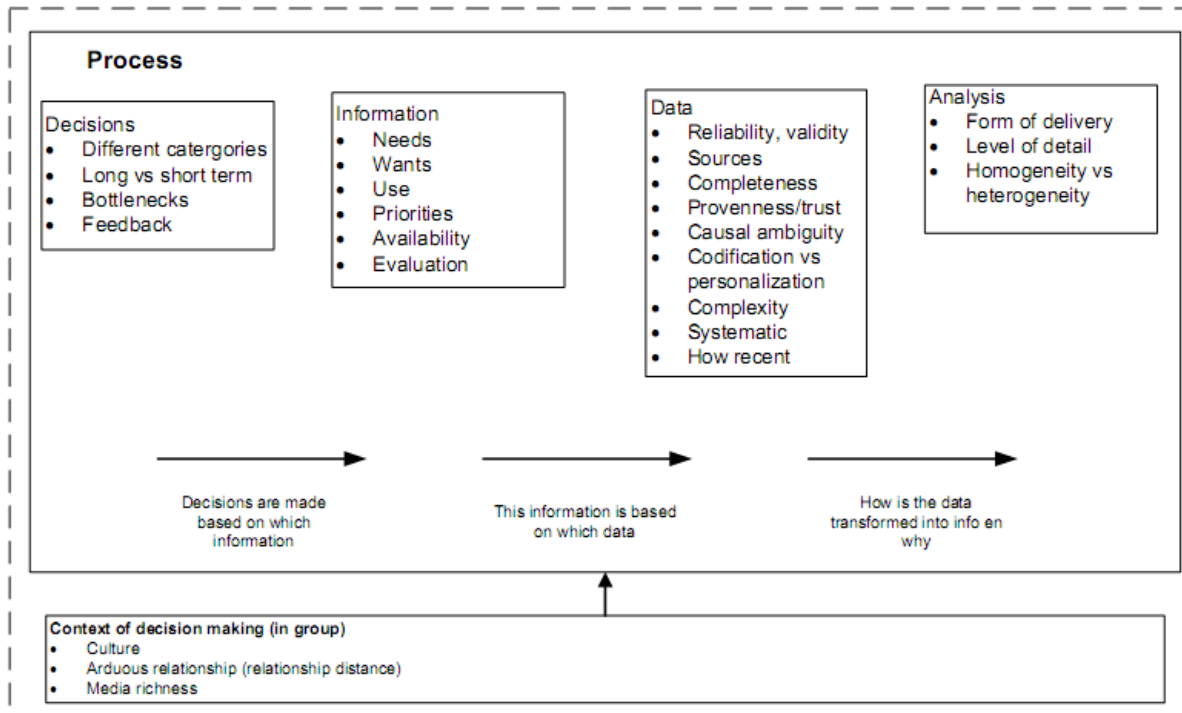
The cause and effect diagram had been removed concerning confidential issues.
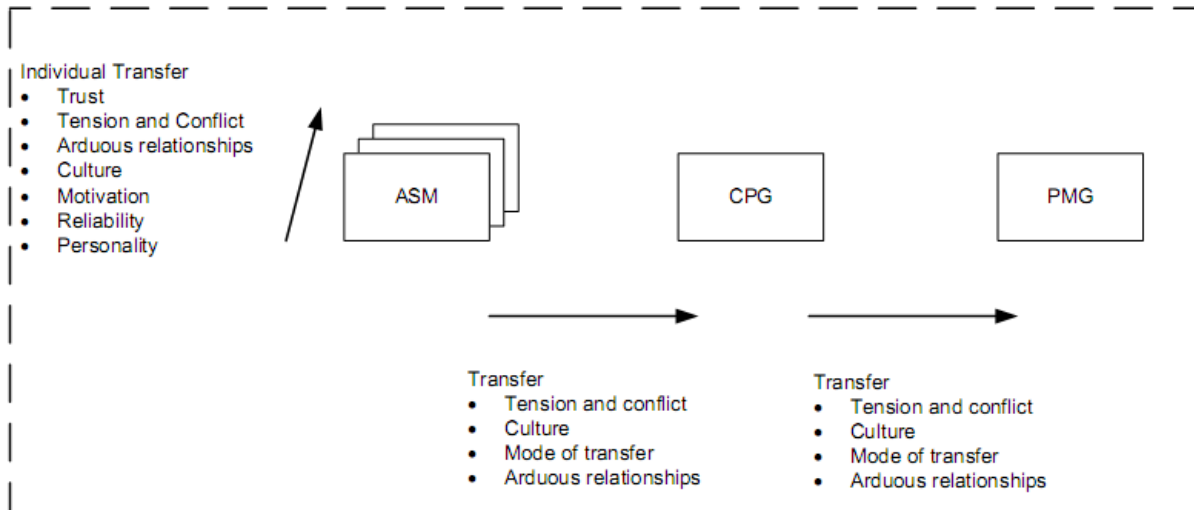
Appendix B Information flow between departments

Figure concerning information flow between departments is confidential

Appendix C Interview framework

Horizontal dimension
In group decision making

Process

Decisions
- Different catergories
- Long vs short term
- Bottlenecks
- Feedback

Information
- Needs
- Wants
- Use
- Priorities
- Availability
- Evaluation

Data
- Reliability, validity
- Sources
- Completeness
- Provenness/trust
- Causal ambiguity
- Codification vs personalization
- Complexity
- Systematic
- How recent

Analysis
- Form of delivery
- Level of detail
- Homogeneity vs heterogeneity

Decisions are made based on which information

This information is based on which data

How is the data transformed into info en why

Context of decision making (in group)
- Culture
- Arduous relationship (relationship distance)
- Media richness

Vertical dimension
Between group information exchange

Individual Transfer
- Trust
- Tension and Conflict
- Arduous relationships
- Culture
- Motivation
- Reliability
- Personality

ASM

CPG

PMG

Transfer
- Tension and conflict
- Culture
- Mode of transfer
- Arduous relationships

Transfer
- Tension and conflict
- Culture
- Mode of transfer
- Arduous relationships

Appendix D Interview protocol

1. Short introduction of interviewer, purpose of the interview, referring to interview as follow up from explorative survey.

   Time frame: 5 minutes

2. Practical information: Name of interviewee + sales area, telephone number, email, availability for contact of possible follow up questions.

   Time frame: 5 minutes

The following questions need to be answered by all interviewees, so a comparison between interviews based on codifying interview transcripts can be done. Possible follow up questions might be asked via email depending on the information that is missing.

3. Which decisions are made within you specific decision making group?

Probes:

- Which categories can be distinguished?
- Can difference be distinguished between long and short term decisions?
- What kind of bottlenecks do you experience in your decision making?
- How to deal with feedback regarding the decisions made?

Time frame: 15 minutes

4. Which information is used for the decisions made?

Probes:

- Which information is really needed for the decisions made? (Need to Know)
- Which information is nice to know for certain decisions?
- Market, customer, competitor, rules and regulations, and technological information.
- What are the information priorities based on the need and nice to know?
- Where is the information used for?
- What is the availability of the information?
- How do you evaluate the decisions based on the information used?
- Which information would be useful to be provided by the intelligence system? (Essential info which can be analyzed and provided on a daily basis or standard at a certain period in time).

Time frame: 20 minutes

5. Which data supports this information? Where are you looking for?

Probes:

- Which sources are used for data gathering?
- On what aspects is the data judged when the decision is made to use it or not?
- When and how to decide whether enough data is gathered? (time available)
- How recent does the data have to be? Also related to the different decisions made?
- Using the same sources again or looking for others as well?

Time frame: 15 minutes

6. How is the data analyzed so decisions can be based on all the information at hand?

Probes:

- In which form do you prefer to have your information?
- What is de required level of detail for the information?
- How varied is the information needed for decision making?

Time frame: 10 minutes

7. Do you experience any problems related to context in which the decision making takes place?

Probes:

- Difference in culture with American partners?
- Problems with video conference?
- Problems with distance?

Time frame: 10 minutes

Second part of the interview (between group transfers)

8. How is the information exchange going as an input for decision making from other parties? (ASM)

Probes:

- Conflicting interests between parties?
- Difficulty in distance between different parties? (culture, language, trust)

Time frame: 10 minutes

Appendix E List of interviewees

29 people were interviewed for data collection; however their names and functions are confidential

Appendix F Survey for the PMG

Needs Assessment Market Intelligence
Questionnaire for Product Market Group – Company X

For a company to gain insight and act pro-active one needs a competence that enables them to gain relevant insights from the internal and external analysis environment. The degree to which a company is able to generate this information in a systematic way and to translate this into decisions and effective strategies is determining for the playground of Market Intelligence, especially where important innovative decision making is concerned.

We are now in the phase to define the needs and corresponding priorities for market intelligence within company x on the strategic level, where the PMG is one of the decision-making bodies. Therefore, I would like to gain insight in the decisions you need to take within the PMG and what information is needed to take them successfully. This input is of the utmost importance to define the current situation and to identify gaps and opportunities. For the coming months I will be working in cooperation with Joost van Kesteren, a graduation intern from the Technical University in Eindhoven who is doing his research project with us.

We would like to ask you to fill out and return this survey **before the first of May 2012.** Thank you in advance, we look forward to your replies. With open communication and feedback from both sides we can progress as a whole.

Kind regards,

Joost van Kesteren

Part II: General Information

Name:

Position:

Location of work office:

Role in PMG:

Part III: Needs

1. Which decisions do you need to take and what type of information do you need for that? Please rate accordingly the availability and importance of this type of information needed.
   Example categories: markets, competitors, customers, regulations, technologies.

Category	Decisions	Type of information needed	Availability *(Scale 1-5)*	Importance *(Scale 1-5)*
1				
2				
3				

2. Based on the decisions that are made within the PMG, what kind of information is spread to which groups and why (e.g. output of PMG can serve as feedback for the CPG or input for the PSG, etc.)?

3. Which information sources do you currently use for <u>specific categories</u>?

Category	Source	Internal or external?	How useful? ** (scale from 1 to 5)	Comments Why?
1				
2				
3				

** In which 1 = very useful (gaining insight) and 5 = basic info (past oriented)

4. What are the main bottlenecks you experience within the PMG to take and define successful decisions?

Part IV: Additional Comments

Do you have any additional comments, ideas or recommendations to take along?

Appendices that remain confidential

Appendix G   NPD process, timeline involvement and the value proposition

Appendix H   Quotes related to the bottlenecks unrelated to the MIS

Appendix I   Analysis of missing information

Appendix J   Cross case analysis of missing information

Appendix K   Proposal for the MIS for Company X