MASTER

Improving the sales force performance in the market of dredge equipment analysis of a CRM solution and the conditions for successful implementation

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Improving the sales force performance in the market of dredge equipment: Analysis of a CRM solution and the conditions for successful implementation

by
Arjan Bouter

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Student identity number 0662120

in partial fulfilment of the requirements for the degree of

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in Operations Management and Logistics

Supervisors:
dr. S.A. Angelov, TU/e, IS
dr. J.J.L. Schepers, TU/e, ITEM
ir. A.C. Korving MBA, Company supervisor
TUE. School of Industrial Engineering.
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I. PREFACE

This report describes the master thesis performed in the partial fulfillment of the requirements for successful completion the master program Operations Management & Logistics at the Eindhoven University of Technology. The execution of the master thesis project has been a great learning experience for me, for which I would like thank multiple persons.

First of all I would like to thank my mentor and first supervisor from the TU/e, dr. S.A. Angelov. During the discussions we had on different subjects, your critical view stimulated me to develop better understanding of the matter and continuously improve my work. Without your supervision, the report would not have been accomplished the way it currently is. Secondly, my thanks go to my second supervisor from the TU/e, dr. J.J.L. Schepers. Thank your time to discuss my work and providing the constructive feedback that helped me to realize the project.

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Special thanks go to my parents. You gave me the opportunity to study in the first place. I appreciate your never ending support no matter what choices, which inspired me to achieve this result. My final thanks go to my girlfriend Gesine who always believed in me and has been a great back up in the few difficult periods I encountered during the cause of study.

Arjan
II. ABSTRACT

This report describes the relationship between Customer Relationship Management and Market Orientation. The simultaneous application of both concepts to the same organization, a major player in the market of dredge equipment, revealed that the two concepts are complementary. By applying both concepts in parallel, a CRM solution can be developed, while simultaneously test the presence of the appropriate organizational conditions for successful implementation of this solution. This should result in increased success rates for CRM-implementation.
III. MANAGEMENT SUMMARY

Context
SMES, a major player in the global market for dredging and mining vessels and equipment, and an international market player in the field of custom build ships and supplies for offshore construction, recently implemented a new product line structure as a first step towards a new customer-centered mindset. However, with this new organizational structure, the sales force remains spread out over the organization. A customer-oriented view requires complete alignment and full cooperation between the different sales functions across the organization, in order to establish a single view of the customer for SMES and a single view of SMES for the customer. In the recent past, the organization has signaled that sales forces are poorly aligned, which hampers the organization in achieving the desired customer-centered focus and ultimately to reach her target of revenue growth. Therefore, the inefficiency and ineffectiveness of the current sales force was proposed as the central problem of the research project.

A review of the literature revealed that the implementation of Customer Relationship Management (CRM) and insights in the level of Market Orientation (MO) and its antecedents can contribute to the improvement of the efficiency and effectiveness of the sales force of SMES. Therefore, these two concepts were simultaneously applied at SMES in order to address the central problem of this research. A close relationship between the two concepts intuitively exists, but despite multiple attempts, the literature is lacking a valid relationship between CRM and MO. Therefore, this research also aimed at the revision of the relationship between CRM and MO.

Method
In the first part of the research, the Enterprise Architecture (EA) framework of Zachman was used to describe the current structure of the sales force, including the organizational structure, business processes, the information used and the IT landscape supporting the sales force. An analysis of the as-is situation was performed to identify the causes of the inefficiency and ineffectiveness of the sales force. Based on this analysis, the requirements of the CRM solution were developed and described, again by applying the selected Zachman framework.

The second part of the research was concerned with the assessment of the level of MO and the appropriate organizational conditions that stimulate the desired market-oriented behavior. In order to do so, a survey was conducted in the organization. The organizational conditions measured, which were adopted from a widely used survey, are (1) top management emphasis, (2) top management risk aversion, (3) interdepartmental conflict, (4) interdepartmental connectedness, (5) centralization of decision making, and (6) reward system orientation.

The third part covered the identification and formulation of the relationship between MO and CRM. Firstly, the proposed relationship between the two concepts was developed, based on the findings of the literature review. After that, evidence from the SMES case was collected, derived from the findings from the first two parts of the research, in order to support the proposed relationship. Based on the results of the third part, conclusions were drawn on the relationships between the applied methods and results of the first two parts.

Results
The result of analysis of the CRM solution show that performance of the sales force can be improved with the implementation of CRM, by providing all sales representatives a 360° view of the customer, automating manually performed tasks, and limiting the number of contact persons
for smaller customers. This solution is mainly IT based and partially requires the commitment of the sales representatives to fill the system with the required data.

The results of the survey show that the level of MO at SMES is too low in comparison with the organization’s ambition to be a market-oriented organization. Furthermore, these results show that most of the organizational conditions that stimulate market-orientation are not present. By shaping the right organizational conditions, more market-oriented behavior will be displayed which implicitly means that the organization will collect and disseminate more customer-related information and that the organization responds better to this information. This, in turn, leads to an increased efficiency and effectiveness of the sales force.

The analysis of the relationship between CRM and MO shows that they are overlapping concepts with similarities and differences. The concepts are similar in the sense that they both refer to the generation and dissemination of customer intelligence and the response to it, in order to create superior customer value. Since the suggested CRM solution is only concerned with customer information, MO differs from CRM as it is also concerned with the generation of, the dissemination of and response to information on competitors and external factors. In the case of SMES, the CRM solution mainly comprises the envisioned CRM system, which is an enabler of the desired market-oriented behaviour. Therefore, CRM is different from MO in the sense that CRM incorporates the IT system as an enabler of market-oriented behaviour, whereas the concept of MO does not specifically refer to supportive IT systems.

Conclusions
The application of the EA framework resulted in (1) the identification of the causes of the inefficiency and the ineffectiveness of the sales force and (2) the design of a conceptual CRM solution to eliminate these causes. One of the observations is that the designed CRM solution requires that employees need to deliver extra effort, which is not in their own interest, but is in the interest of the customer and thus benefits the organization as a whole. This required behaviour is labelled as market-oriented behaviour. The survey tested the presence of the appropriate organizational conditions to display market-oriented behaviour and the results show that most of these organizational conditions are not present. Based on this observation, it can be concluded that the organization is not ready for the suggested CRM solution.

The final conclusion is that both applied methods complement each other: the application of the EA framework led to a CRM solution to improve the performance of the sales force and that the conducted survey led to insight in the presence of the appropriate organizational conditions for a successful implementation of the suggested solution. The combination of the two methods leads to better insights than the application of one of these methods alone.

Recommendations
Although the efficiency and effectiveness of the sales force can be improved by means of CRM implementation, the organization is not ready to make the implementation of the suggested solution successful. The reason is that this solution requires that employees deliver extra effort to fill and use the system, which is not in their own interest. This lack of market-oriented behaviour should be addressed by improving the organizational conditions that stimulate this behaviour. Therefore, it is recommended to SMES to first improve the antecedents of MO, before implementing the suggested CRM solution.
Specifically, the antecedents depicted in the table below should be improved:

<table>
<thead>
<tr>
<th>Antecedent</th>
<th>Relevant department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reward system orientation</td>
<td>Entire organization</td>
</tr>
<tr>
<td>Top management emphasis</td>
<td>SMES Components and PL Custom Build Cutters</td>
</tr>
<tr>
<td>Top management risk aversion</td>
<td>SMES Components, SMES Control and PL Custom Build Cutters</td>
</tr>
<tr>
<td>Interdepartmental conflict</td>
<td>SMES Components</td>
</tr>
</tbody>
</table>

In order to improve the reward system orientation, SMES should adjust its reward system by incorporating market-based factors for the evaluation of employees and administering rewards.

Top management emphasis, top management risk aversion, and interdepartmental conflict are less tangible characteristics and therefore not easily changed. In order to achieve the required organizational change, appropriate leadership is vital and should be displayed by top management. Furthermore, only in organizations whose core value is the continuous creation of superior customer value for customers will there be requisite leadership. In order to achieve this, the following steps are recommended for SMES:

1. Establish a sense of urgency in the organization for creating a market orientation
2. Form a powerful guiding coalition for creating market orientation
3. Create a vision of market orientation
4. Communicate this vision
5. Empower others to act on the vision
6. Plan for and create short-term wins
7. Consolidate improvements based on the market performance and produce still more change
8. Institutionalize continuous learning and improvement in attracting, retaining and growing targeted customers

These are, however, guidelines and not a concrete plan to establish and maintain an increased level of MO. The set up of such a plan for SMES goes beyond the scope of this project. This is, therefore, a recommendation for further analysis in succession of this research.
# TABLE OF CONTENTS

I. PREFACE ..................................................................................................................... iii  
II. ABSTRACT ................................................................................................................. iv  
III. MANAGEMENT SUMMARY ................................................................................... v  
TABLE OF CONTENTS .............................................................................................. viii  
1. Introduction ............................................................................................................... 1  
   1.1 Company .............................................................................................................. 1  
      1.1.1 Organizational structure .............................................................................. 1  
      1.1.2 Problem context ......................................................................................... 1  
      1.1.3 Problem definition ..................................................................................... 2  
   1.2 Literature .......................................................................................................... 3  
      1.2.1 Customer Relationship Management ......................................................... 4  
      1.2.2 Market Orientation ..................................................................................... 5  
      1.2.3 MO and CRM ............................................................................................ 7  
   1.3 Research Questions ......................................................................................... 8  
   1.4 Report outline ................................................................................................... 9  
2. Research design ..................................................................................................... 10  
   2.1 Research method ............................................................................................... 10  
      2.1.1 The applied EA framework for the development of CRM requirements ...... 11  
      2.1.2 The applied survey for measuring MO and its antecedents ......................... 16  
      2.1.3 Identification and formulation of the relationship between MO and CRM ... 18  
   2.2 Validation methods ......................................................................................... 18  
      2.2.1 Validation method for the developed models and identified causes .......... 18  
      2.2.2 Validation method for the survey results ....................................................... 19  
      2.2.3 Validation method for the relationship between MO and CRM ................. 19  
3. Results of the applied EA framework .................................................................... 20  
   3.1 Results of modelling the as-is situation ............................................................. 20  
      3.1.1 As-is – Scope level ..................................................................................... 20  
      3.1.2 As-is – Organization level ......................................................................... 23  
      3.1.3 As-is – System level .................................................................................. 27  
      3.1.4 Validation of the models of the as-is situation .......................................... 30  
   3.2 Results of the analysis of causes .................................................................... 30
1. Introduction

This thesis describes how the efficiency of the sales force of a major player in the global market of dredge equipment can be improved by means of Customer Relationship Management (CRM) implementation. In this first chapter, the research project is introduced in terms of the subject and purpose of the thesis, as well as the context in which the research took place. In section 1.1, an introduction to the company is presented in which the research was carried out, followed by the problem context and problem definition. Next, a literature review on the relevant fields of research is addressed in section 1.2. Subsequently, the research questions of this thesis are presented in section 1.3. Section 1.4 concludes this chapter with the structure of the sequel of the report.

1.1 Company

The research was carried out at SMES\(^1\), a Dutch company focusing on designing and constructing advanced vessels and equipment for the specialist maritime sector. It is a major player in the global market for dredging and mining vessels and equipment, and an international market player in the field of custom build ships and supplies for offshore construction. The company’s customer base includes dredging operators, oil and gas corporations, offshore contractors and government authorities, for who SMES’s products are vital for business.

SMES’s ambition is to be the market leader in equipment for both the dredging and mining industry as well as the offshore and marine industry, based on their specific knowledge and expertise in these fields. It aims to be an innovator by continuously focussing on the development of new technologies and delivering equipment with a long and successful lifetime to its customers in order to sustain a long-term partnership.

Its revenues had been sustainably growing from 457 million Euros in 2005 to 1,1 billion Euros in 2009 and it reported a revenue of 1,0 billion Euros in 2010. SMES has approximately 2800 employees based at various locations in The Netherlands, China, Croatia, France, India, the Middle East, Nigeria, Russia, Singapore, Slovakia, the United Kingdom and the United States of America.

1.1.1 Organizational structure

SMES consists of 34 Business Units (BUs), which are clustered in the three divisions Dredging, Offshore and Technology. Each division serves its own market. Furthermore, the BUs operating in the Technology division fulfil also an important internal supply and support function for the other companies of the SMES group, as depicted in figure 1.

\(^1\)For confidentiality reasons, the company name was changed into a fictive name. This applies to all company-related names throughout the thesis
The organizational structure is a matrix structure with twelve different Product Lines (PLs) and twelve different areas. Each PL offers a different part of the product portfolio and serves a specific market within either the dredging or the offshore market. Each PL is responsible for every aspect of the products it offers in all areas, covering the complete life cycle of these products. This implicates that within its portfolio, the PL is responsible for sales, results, marketing, product development, design, cost estimation, production and technical support (TS). Each Area Manager is responsible for sales and margins of new build activities in a specific region, covering all PLs. The PLs make use of shared resources for technology, production and the BUs in the Technology division. This results in the matrix structure depicted in figure 2, where only three PLs are displayed for simplicity. The box ‘Area Management’ represents all twelve Area Managers.

![Organizational Structure of SMES](image)

1.1.2 Problem context

To fulfil its mission to be market leader based on technological innovation, SMES set itself the aim to grow in revenue to 2 billion Euros. Part of the strategy SMES follows to reach this target is to shift from a product-centred view to a customer-centred view in order to get closer to the customer. By doing so, the organization gets a clearer view on market needs. By aligning product development and innovation with these needs, the organization hopes to improve its ability to fulfill customer demand and thereby increase its market share and revenue.

A first step towards the new customer-centered mindset has been the implementation of the PL structure at the end of 2010, where products are clustered based on different markets for different products and each PL is responsible for its own product. Before that, the ownership of products was divided over different BUs, based on the functionality of different products, rather than markets for different products.

However, with this new organizational structure, the sales force remains spread out over the organization with the area management and PLs aiming at selling large equipment, such as complete vessels, and the BUs in the Technology division having their own sales departments for selling smaller products, such as hydraulic components and pumps. This results in a
complex multi-layered sales structure. A customer-oriented view requires complete alignment and full cooperation between the different sales functions across the organization, in order to establish a single view of the customer for SMES and a single view of SMES for the customer. In the recent past, the organization has signaled that sales forces are poorly aligned. Three examples illustrating this misalignment are: different representatives sending different quotations in response to the same customer request; sales representatives from different departments are ignorant about each other’s visits to the same customer; and sales leads not reaching the appropriate sales representatives. The misalignment of the different sales functions hampers the organization in achieving the desired customer-centered focus and thus in achieving her target of revenue growth.

Another obstacle in the pursuit of the customer-centered focus is the lack of transparency at higher levels in the organization, which is illustrated by the fact sales representatives deliberately keep important customer information for themselves as long as it is not in their own interest to share it with others. A customer-centered organization, however, would strive for a complete and coherent view of its customers throughout the organization, in order to deliver superior customer value. Therefore, the organizational culture in which this lack of transparency is accepted further impedes the organization in achieving a customer-centered view.

1.1.3 Problem definition

In preparation of the thesis, several interviews with sales representatives at different levels in the organization were held in order to identify the main problems from which the sales force is currently suffering. Based on these interviews, the Ishikawa diagram displayed in figure 3 was developed, which reveals the preliminary identified causes of the inefficient and ineffective sales force.

The consequences of the inefficiency and ineffectiveness of the sales force are shown in the cause-and-effect diagram figure 4, indicating that an inefficient and ineffective sales force eventually leads to losses of sales. This diagram was also developed based on the results of the interviews. Prior to the execution of the project, both diagrams were discussed with several of the interviewees as a first step towards validation of the problem structure.
The results of the interviews held in preparation of the thesis indicated that the current sales processes hamper the organization in achieving a customer-centered mindset and ultimately to reach her target of revenue growth. Therefore, the inefficiency and ineffectiveness of the current sales force was proposed as the central problem of the project.

The following statement reflects the problem central to this thesis:

*The current sales force is inefficient and ineffective.*

### 1.2 Literature

Based on the Ishikawa diagram in figure 3, the insufficient availability of customer related information to sales representatives was identified as a major cause of the poor alignment of the sales force. In other words, the inefficiency and ineffectiveness were thought to be partly the result of the lack of a comprehensive view of the customer by sales representatives. Two fields of research are considered relevant to address this problem: CRM and Market Orientation (MO). The relevance of these two fields of research is now briefly explained.

Approaching the identified problem from an IT perspective, the concept of CRM turns up, because a CRM system is often referred to as a system used to organize, automate, and synchronize customer-related business processes. Claims from literature underline the relevance of CRM in this project. Chalmeta, for example, reported that CRM can be used to improve the effectiveness and efficiency of the processes involved in customer relationships (Chalmeta, 2006). Furthermore, different authors claim that CRM helps to ensure that both an organization and its customers have a single view of each other (e.g. Teo, Davadoss and Pan, 2006; Chalmeta, 2006). These claims show that CRM can contribute to the improvement of the performance of the sales force and is, therefore, considered to be a relevant field of research for this project.

Approaching the identified problem from a marketing perspective, the field of MO is considered to be relevant, because it refers to an organizational culture that supports the collection of information of customers and competitors in order to provide excellent value for customers in efficient processes (Narver and Slater, 1990). As pointed out earlier, the insufficient availability of customer related information to sales representatives was identified as a major cause of the inefficiency and effectiveness of the sales force. Therefore, the insights in MO concept can contribute to the improvement of the efficiency and effectiveness of the sales force.

In the next sub sections, both fields of research are separately discussed in more detail, followed by a discussion of the relationship between the concepts of CRM and MO.
1.2.1 Customer Relationship Management

CRM is a holistic, customer-centered business approach, ranging from strategy to IT, which aims at the identification and satisfaction of customers' needs. In the past two decades, a considerable amount of literature has been written on CRM by both practitioners and scholars (Payne and Frow, 2005) and it is still increasing (Rapp, Trainor and Agnihotri, 2010). Also, a substantial number of companies have started CRM initiatives. Survey results from Verhoef and Langerak show that in 2002, 65 percent of the large companies in the US and Europe were aware of CRM technology, 28 percent were developing it and 12 percent were using CRM applications (Verhoef and Langerak, 2002). These percentages have increased substantially since then, evidenced by the revenue growth in the CRM software market. Rapp et al. report a total revenue growth of 20 percent in 2007, summing up to $8 billion and an expected revenue of $13.3 billion in 2012 (Rapp et al., 2010).

Despite the wide adoption and theoretical discussion of CRM, there is no single, comprehensive view on what it is. Some companies see CRM primarily as investments in technology and software, whereas others treat CRM more extensively aiming at developing profitable relationships with customers (Reinartz, Krafft and Hoyer, 2005). Furthermore, literature does not provide a generally accepted definition of the concept, since the literature on this topic reveals a variety of explanations and definitions of the term. Payne and Frow argue that most definitions of CRM can be placed on a continuum, ranging from the implementation of a specific technology solution to a complete organizational culture embracing a holistic approach and strategy towards managing customer relationships (Payne and Frow, 2005).

Literature does provide an explanation for this diversity. Ryals and Payne, for example, state that the appearance of the term CRM in the software vendor community is most likely the reason why the term CRM had commonly been used in the context of technology solutions in the 1990s (Ryals and Payne, 2001). On the other hand, several authors argue that CRM is the natural development out of relationship marketing (e.g. Chalmeta, 2006), which is concerned with how organizations govern their relationships with customers based on the notion that customer relationships are assets that can be managed in order to increase customer retention and profitability (Ryals and Payne, 2001). Relationship marketing is built on the premise that obtaining a new customer costs five times more than to keep an existing one (Christopher, Payne and Ballantyne, 1991). Goodhue, Wixom and Watson attempted to combine the technology view of CRM and the relationship marketing concept, by stating that CRM extends the possibilities of relationship marketing by providing IT solutions that take over the labor intensive activities related to customer relationship maintenance and thereby making relationship marketing applicable to a wide range of customers (Goodhue, Wixom and Watson, 2002). Kale (2004) mentions the organization’s resources and business processes as another important aspect of CRM. He explains this by stating that IT aids in exercising marketing practices, but that technology in itself does not bring customer retention. Instead, the human resources performing business processes deliver customer retention, supported by IT. Payne and Frow attempted to combine the different views of CRM in one single, comprehensive definition:

“CRM is a strategic approach that is concerned with creating improved shareholder value through the development of appropriate relationships with key customers and customer segments. CRM unites the potential of relationship marketing strategies and IT to create profitable, long-term relationships with customers and other key stakeholders. CRM provides enhanced opportunities to use data and information to both understand customers and co-create value with
This last definition covers multiple aspects of CRM, ranging from strategy to technology. It reflects that:

1) CRM is a business strategy;  
2) CRM is customer-focused, in the sense that it aims at improving relationships with customers;  
3) CRM needs to be embedded in the processes, structure and culture of the organization;  
4) CRM is IT-enabled.

By including these four aspects, this definition covers the complete spectrum of CRM definitions. Therefore, the definition of Payne and Frow (2005) was adopted for this project. In the sequel of this paper, these aspects will be referred to as the strategic, customer, organizational and IT aspect of CRM.

Based on a wide range of definitions, multiple CRM models have been developed during the last two decades, of which the ones developed by Payne and Frow (2005) and Buttle (2004) are two illustrative examples. These CRM models provide a comprehensive view of the relationships between different aspects of CRM and suggest several phases that need to be addressed sequentially, in order to achieve the desired outcomes of CRM implementation. That is: profitable long-term relationships with customers. The CRM models, however, are no methods that describe how to develop a CRM solution and therefore do not provide sufficient help for addressing the central problem of this research.

Aside from the developed CRM models, several books have been written, providing guidelines for developing a CRM program (e.g. Buttle, 2009; Dyché, 2001), where a CRM program can be defined as a set of practices aimed at improving the relationship with customers. The authors present concepts, technologies and tools that can be helpful in determining the required system functionalities that could contribute to the improved efficiency of the sales force. They lack, however, a structured, comprehensive method for the development of a CRM solution that covers all the aspects of CRM, according to the adopted definition.

1.2.2 Market Orientation

The concept of MO has been receiving considerable attention since the early 1990s, resulting in a rich body of work. It is an extension of the marketing concept, which is the philosophy that firms should analyze the needs of their customers and then make decisions to satisfy those needs, better than the competition (Kohli and Jaworski, 1990). Multiple studies have shown that there is a positive relationship between MO and business performance (e.g. Homburg and Pflessor, 2000; Jaworski and Kohli, 1993).

Most of the research on MO builds on two papers published in 1990, by Kohli and Jaworski, and by Narver and Slater (Narver, Slater and Tietje, 1998), resulting in two streams of research within the field: MO from a behavioral perspective and MO from a cultural perspective (Homburg and Pflessser 2000). From a behavioral perspective, MO is defined as the organization wide generation of market intelligence pertaining to current and future needs of the customers, dissemination of intelligence horizontally and vertically within the organization, and organization wide responsiveness to it (Jaworski and Kohli, 1993). From a cultural perspective, MO is
defined as the business culture that most effectively and efficiently creates superior value for customers (Narver and Slater, 1990).

The main difference between the two perspectives is that the behavioral perspective focuses on organizational activities related to market intelligence, whereas the cultural perspective focuses on organizational norms and values that encourage behaviors that are consistent with MO (Deshpandé, Farley, and Webster, 1993). There are, however, also similarities between the two streams of research. Although Narver and Slater define MO as an organization’s culture, they operationalize MO in terms of behavior, instead of norms and values. In the same paper as they present their definition, the authors state that MO contains three major behavioral components: “customer orientation”— the continuous understanding of the needs of both the current and potential target customers and the use of that knowledge for creating customer value; “competitor orientation”— the continuous understanding of the capabilities and strategies of the principal current and potential alternative satisfiers of the target customers and the use of such knowledge in creating superior customer value; and “interfunctional coordination”— the coordination of all functions in the business in utilizing customer and other market information to create superior value for customers (Narver and Slater, 1990). The authors continue with the notion that the three behavioral components comprehend the activities of market information acquisition and dissemination and the coordinated creation of customer value, which is consistent with the definition of Kohli and Jaworski.

Deshpandé, Farley and Webster, however, take a more fundamental position. They build on the research of Narver and Slater and fit into the cultural stream of research. They define MO as the set of beliefs that put the customer’s interest first, while not excluding those of all other stakeholders such as owners, managers and employees, in order to develop a long-term profitable enterprise (Deshpandé, Farley and Webster, 1993). In their opinion, a simple focus on information about the needs of actual and potential customers is inadequate without consideration of the more deeply rooted set of values and beliefs that are likely to consistently reinforce such a customer focus and pervade the organization.

Despite these different views of MO, both streams of research suggest a positive relationship between MO and business performance and a vast amount of studies provide evidence for this relationship (e.g. Jaworski and Kohli, 1993; Homburg and Pflessor, 2000, Farrell, 2000). Furthermore, multiple studies show by means of meta-analyses that this relationship is generic across different countries, different cultural contexts and different industries (e.g. Cano, Carrillat and Jaramillo, 2004; Kirca et al. 2005; Ellis, 2006).

Besides the link between MO and business performance, the literature also provides insights in what constitutes a MO. Jaworski and Kohli, for example, found that factors related to top management commitment, interdepartmental dynamics and organizational systems (e.g. reward systems) are important antecedents of MO. These findings where confirmed by Kirca et al., who performed a meta-analysis, including 114 studies that measured MO, antecedents of MO and business performance.

In order to be able to measure MO, different instruments have been developed, of which the MARKOR scale, developed by Jaworski and Kohli (1993) and the MKTOR scale, developed by Narver and Slater (1990), are the most extensively used scales (Cano et al., 2004). As stated earlier, Narver and Slater operationalize MO in terms of behavior, instead of more fundamental components of culture, such as norms and values. This is contrast with their definition of MO from a cultural perspective. Deshpandé and Farley compared the different scales and found that
they measure broadly similar concepts and conclude that they can be used interchangeably (Deshpandé and Farley, 1998).

So, both research streams measure MO in terms of behavior. In order to have a definition that is in line with what is measured, the definition by Jaworski and Kohli (1993) is adopted, who define MO from a behavioral perspective.

1.2.3 MO and CRM

Based on the discussion of MO and CRM, a close relationship between the two concepts intuitively exists. Recall from the adopted definition of CRM, that CRM aims at the creation of profitable, long-term relationships with customers. By focusing on the customer, a firm will be able to increase its ability to create superior customer value, which in turn leads to the retention of customers due to their increased satisfaction with the firm. Similar statements have been made about MO. Javalgi, Charles and Young, for example, state that a business is market oriented when its culture is systematically and entirely committed to the continuous creation of superior customer value (Javalgi, Charles and Young, 2006). Also, Slater and Narver, mention that the heart of a MO is a firm’s customer focus (Slater and Narver, 1995). So, both CRM and MO are about customer focus and creating superior customer value. Despite the similarities between MO and CRM, remarkably few papers have been written on the relationship between the two concepts.

Javalgi et al. present a conceptual foundation that integrates the concepts of marketing research, MO and CRM (Javalgi et al., 2006). The authors adopt the definition of market research given by Aaker, Kumar and Day, who define this as the process of planning, collecting and analyzing customer-oriented information for use in making decisions (Aaker et al., 2004). For MO, they adopt the previously introduced definition of MO given by Jaworski and Kohli (1993). According to the authors, the Jaworski and Kohli definition has as its central theme the concept of market information, and therefore, market research and MO are inextricably related. The authors go on to say that a market-oriented organization takes market research information and transforms it into market intelligence that then gets disseminated throughout the firm, to which the firm responds appropriately. According to Javalgi et al., CRM is a strategic concept which incorporates the strategic outcomes of satisfaction, loyalty, customer retention and profitability while relying on technology to harness market-relevant data and guide decision making. Subsequently they say that satisfaction, loyalty, retention and profitability are the consequences of a MO, which in turn, is the result of developing and integrating information through effective use of marketing research. Based on this reasoning, they finally conclude that market research information forms the foundation for the firm’s MO, which results in the positive strategic outcomes of CRM. That is, increased customer satisfaction, loyalty, retention and profitability.

In their paper on key capabilities for the creation of customer value, Landroguez, Castro and Cepeda-Carrón also address both the concepts of MO and CRM (Landroguez et al., 2011). Firstly, they present their definitions of the concepts. They define MO as the generation of appropriate market information pertaining to customers’ current and future needs, and the relative abilities of competitive entities to satisfy these needs; the integration and dissemination of such information across departments; and the coordinated design and execution of the firm’s strategic response to market opportunities. CRM is defined by the authors as the firm’s activities that are oriented towards creating and maintaining long-term relationships with their customers to obtain their loyalty and satisfaction. The authors continue with proposing relationships between MO, CRM and customer value. Firstly, they state that MO has a positive effect on
customer value. One argument the authors present for this proposition, amongst others, is the claim by Slater and Narver (1998), who note that the main element of MO is the firm’s total commitment to the continuous creation of superior customer value. Secondly, they suggest a positive relationship between CRM and customer value, based on the statement that CRM is about creating and maintaining long-term relationships with customers, so that, over the course of these relationships, a continuous improvement in customer value delivery will evolve. The authors’ third suggestion is a positive influence of MO on CRM. However, the authors do not provide clear arguments for this proposition. Instead, they point out that CRM constitutes a way of being market-oriented. This seems to contradict the proposition, since it suggests that CRM is an example of MO rather than CRM being enhanced by MO. An explanation can be found when looking at the context of their research. They refer to MO and CRM as capabilities of an organization for the creation of customer value and state that MO is the culture necessary to build long-term relationships with customers, which is the aim of CRM. This statement, however, is contrary to their definition of MO, where they clearly define MO in terms of behavior, rather than culture. So, although Landroguez et al. follow the same reasoning as Javalgi et al. (2006) by arguing that MO will lead to improved relationships with customers, there proposition is not in line with their definitions of the concepts.

In both studies MO is pointed out as behavior and both studies claim that MO supports the creation of superior customer value. The studies differ slightly in their definition of CRM. Javalgi et al. have a more strategic view on CRM, as they define it as an IT-enabled strategy which incorporates the strategic outcomes of satisfaction, loyalty, customer retention and profitability. On the other hand, Landroguez et al. have a more behavioral view of CRM, as they define CRM as a set of activities aimed at obtaining customer loyalty and satisfaction. Despite this small difference, both studies suggest a unidirectional relationship between the concepts of MO and CRM. That is: MO has a positive impact on CRM. The support for these claims is however rather weak. Firstly, the proposed relationship is lacking sound validation. Javalgi et al. present only a single case study for supporting their claim. The paper by Landroguez et al. only presents a conceptual foundation, lacking any validation. Furthermore, the weakness of the arguments of Javalgi et al. lies within their definition of CRM. The authors state that CRM incorporates the strategic outcomes of satisfaction, loyalty, customer retention and profitability. Compared to the definition of CRM adopted for this research, these outcomes are the results of effective CRM, rather than a part of it. Similarly, as stated earlier, the argument presented by Landroguez et al. contradicts the suggested relationship as they point out that CRM constitutes a way of being market-oriented. This lack of strong evidence for the proposed relationship between MO and CRM gives rise to the revision of the positioning of the two concepts relating to each other.

1.3 Research Questions

In this section, the research questions formulated for this project are presented. Recall from section 1.1.3 that the inefficiency of the sales force of SMES was the central problem of this project and that the insufficient availability of customer related information was identified as a major cause of this.

The literature review on CRM revealed that this problem can possibly be resolved with the implementation of a CRM solution. Therefore, part of the project is the identification of how SMES’s sales force can be improved by implementing CRM, whereby CRM is viewed as an IT-enabled business strategy, which is embedded in an organization’s processes, structure and culture. Implementing CRM as a solution for SMES’s current problem of an inefficient sales force is further supported by several studies that state that CRM aims at the establishment and retention of long-term, profitable relationships with customers (e.g. Reinartz, Krafft and Hoyer,
This suggests that implementation of CRM at SMES could contribute to the firm’s aim to become a customer-centered organization. This led to the following research questions:

RQ1: How will the implementation of CRM improve the efficiency and effectiveness of the sales force?
RQ2: What are the conceptual requirements for CRM in order to improve the efficiency of the sales force?

The literature review also showed that MO refers to the collection and dissemination of and response to market information. Furthermore, it revealed that there are several organizational conditions that enhance or impede an organization to be market-oriented. By assessing the level of MO and the level of its antecedents at SMES, the conditions that obstruct the organization to be market-oriented, could be identified. Insights in the obstructions hampering the organization to being market-oriented could reveal the underlying causes of the insufficient availability of customer-related information. Therefore, the following research questions were developed:

RQ3: What is the level of MO at SMES?
RQ4: Which antecedents of MO need to be improved at SMES to increase the level of MO?

With RQ1 to RQ4, the concepts of MO and CRM are separately applied to address the central problem of this research. The literature review, however, indicated that the two concepts are related to each other. In spite of this, the relationship proposed by different authors lacks strong evidence and is, moreover, questionable. This research, in which both concepts were applied in the same organization, leads to new insights in the relationship between MO and CRM. Therefore, the following research question was suggested:

RQ5: What is the relationship between MO and CRM, based on the SMES case?

1.4 Report outline

The remainder of this report is structured as follows: In chapter 2, the design of the research is presented. Next, the results of the research will be presented in chapters 3, 4 and 5. The findings of the research are discussed in chapter 6. The thesis is concluded with conclusions and recommendations in chapter 7.
2. Research design

In this chapter, the design of the research is presented. Consecutively, the applied method, the modelling process, the data collection process, and the validation process are discussed.

2.1 Research method

As the set of research questions already indicates, the project was split into three different parts. The relationships between the three parts are visualized in figure 5. The circles reflect the applied concepts, which are CRM and MO, the squares indicate the applied method for each part, and the cursive texts represent the results of the applied methods. Each part is now separately explained.

![Figure 5 – Relationship between applied concepts, methods and results](image)

The first part, represented by the left circle in figure 5, dealt with the development of the conceptual requirements for a CRM solution for SMES, which addresses the first two research questions. According to the adopted definition, CRM has multiple aspects that need to be taken into account. In order to address these different aspects in a structured manner, an Enterprise Architecture (EA) framework was selected. This framework was used to describe the current structure of the sales force, including the organizational structure, business processes, the information used, the IT landscape supporting the sales force, etcetera. Next, an analysis of the as-is situation was performed to identify the causes of the inefficiency and ineffectiveness of the sales force. Based on this analysis, the requirements of the CRM solution were developed and described, again by applying the selected EA framework.

The second part, represented by the right circle, was concerned with the assessment of the level of MO and its antecedents, in order to address research questions RQ3 and RQ4. For that, a survey was conducted in the organization.

The third part, reflected by the overlap of the two circles, covered the identification and formulation of the relationship between MO and CRM, addressing research question RQ5. Firstly, the proposed relationship between the two concepts was developed, based on the findings of the literature review. After that, evidence from the SMES case was collected, derived from the findings from the first two parts of the research, in order to support the proposed relationship. Based on the results of the third part, conclusions were drawn on the relationships between the applied methods and results of the first two parts. The applied methods for the three different parts are discussed in more detail next three sub sections.
2.1.1 The applied EA framework for the development of CRM requirements

The EA framework selected for this project is the Zachman framework (Zachman, 1987). This commonly used framework, depicted in figure 6, proposes a logical structure for classifying and organizing the descriptive representations of an enterprise in different dimensions (e.g. structure, data, processes, time). Each dimension can be perceived at different levels, which reflects the business-to-IT dimension (e.g. scope level, enterprise level, system level, technology level). This separation of concerns reduces the complexity of the models developed, which in turn increases the readability as well as the understandability of the models. CRM has, according to the adopted definition, organizational aspects (e.g. organizational structure, business processes), which can be separately addressed by the enterprise model of the Zachman framework. The different dimensions of the Zachman allows for addressing the different organizational aspects separately. Besides the organizational aspect, IT is also an important aspect of CRM, which can be addressed by the system level of Zachman. So, the Zachman framework enables the clear structuring of the different aspects of CRM. Apart from the Zachman framework, there are other EA frameworks that include different levels and dimensions, such as the Archimate framework. However, the Zachman framework is the most widely applied and it is known by representatives in the company, which eases the communication of the resulting models. Furthermore, the familiarity with the framework from the author’s side saved time in the sense that it requires effort to get familiar with other architectures.

![The Zachman Framework for Enterprise Architecture](http://www.zachman.com)
As can be seen in figure 6, the Zachman framework consists of six dimensions and six layers, resulting in a total of 36 different representations of the enterprise. However, not all dimensions and layers were considered relevant for this project and therefore, only a part of the Zachman framework was applied. The relevant levels and dimensions used in this research are shown in figure 7. Although the picture of the framework as applied looks different from the picture of the original framework, the levels and dimensions in figure 7 originate from the framework in figure 6. The layers scope, organization and system correspond respectively with the rows scope contexts, business concepts and system logic of the framework in figure 6. The dimensions data, process, people and network correspond respectively with the columns what, how, who and where of the framework in figure 6.

**Figure 7 – The applied framework**

Since this project was a first exploration of the possible benefits of CRM for SMES, the company was only interested in a conceptual CRM solution and only conceptual requirements for CRM were developed. The technical requirements will first start to play a role once the decision has been made to implement CRM. Therefore, the technology level (technology physics in figure 6) was not included in this project. The same applies for the detailed representations (tool components in figure 6), which are first required when the actual design will take place. The operations instances level deals with the perspective of end users and includes models describing how the system operates (e.g. work instructions). Again, this level first comes into picture in a later stadium, when the solution is finally implemented. Therefore, this level was also excluded for this project. The levels that were incorporated are the scope, the enterprise, and the system level. The scope level is included in order to clearly define what is included in the project and what is not. The organization level covers the organizational aspects of CRM, such as the structure and processes. The system level addresses the IT aspect of CRM, in terms of the systems in place to support the sales force in the execution its activities. Therefore, both the organization level and the system level contributed to answering the research questions RQ1 and RQ2.

The dimensions included in this project are the data, process, people and network dimension, because they directly address the causes identified prior to this research, depicted in the preliminary Ishikawa diagram in figure 3. The data dimension describes the information taken into account on each level. Since the insufficient availability of customer information was identified as a major cause of the inefficiency of the sales force, this dimension was included in the research. The process dimension addresses the activities and processes relevant for this
research on each level. The activities performed by the sales force needed to be analyzed in order to identify where the causes of the inefficiency and ineffectiveness occur. The people dimension describes the involved stakeholders on each level. Since the sales function is spread out over the organization, where different sales representatives interact with the same customer and relevant information needs to be shared among the different sales representatives, this dimension was considered relevant for this project. The network dimension was included for the same reason, since it deals with the interactions between the stakeholders on each level. In order to limit the amount of models to a manageable size, the time dimension (when in figure 6) and motivation dimension (why in figure 6) were excluded from this research. They were considered as the least important for this research, because an analysis of why and when activities take place does not directly target the preliminary identified causes depicted in figure 3.

The framework was used to describe the EA of the sales force as it currently is and to describe the desired state of the EA in which the effectiveness and efficiency of the sales force are improved. The description of the as-is situation and the to-be situation consist of a set of models, representing the different dimensions of the EA framework at different levels of the EA framework. Per level, the representations of the different dimensions at the regarding level are discussed. Note that this includes only an explanation of the representations and that the results will be presented in chapter 3.

**The scope level of the EA framework**

Ideally, the research should have covered the entire sales force of SMES and also all activities involving customer interaction. However, due to the limited amount of time, this could not all be taken into account while still delivering the required quality and depth. Therefore, for each dimension a selection was made at this level, limiting the scope of the research to a manageable size.

For the data dimension, a selection of different types of data included in the research was made. The criterion used for the selection of the data types involved in this research is that only the data that is relevant to create a comprehensive view of the customer. In this research, data means a recorded fact. This definition is broader than the definition of data often used in computer science, in which data is considered as information in a form suitable to perform the four basic data operations with a computer, which are create, read, update and delete (CRUD). In this research, a textual description of a fact in a PDF file, for example, is thus considered to be data, although it is not directly suitable to perform operations on this data with a computer.

For the process dimension, a selection was made of the activities involving customer interaction covered by this research. For the selection of the activities addressed in this research two criteria were used. Firstly, the selected processes need to represent an as large as possible part of the variety of activities performed by the sales force. Secondly, since the sales force is spread out over the organization with each sales department responsible for a distinct part of the product portfolio, the selected sales processes need to represent different parts of the product portfolio. For the first criterion, the concept of ‘sales pipeline’ (or sales funnel) was used, which refers to the different states of progress of a (possible) sales order. For the second criterion, the product portfolio was split into two main parts: new build and after sales. New build covers complete vessels, but also components installed in new build vessels. After sales includes all sales related to existing dredge equipment. This includes spare parts and services. Services include a wide variety of service activities, such as commissioning, condition monitoring, component repair, ship repair and renovations.
For the people dimension, a selection of the entities included in this project was made. This is reflected in a table with the involved entities. From the selected activities in the process dimension, entities where identified that are responsible for the execution of these activities. These were included in this research.

The network dimension at the scope level is operationalized by a communication diagram, showing the relevant interactions between the entities involved.

In order to have a description of the to-be situation that is comparable to the description of the as-is situation, the resulting models for the scope level apply to both situations.

The organization level of the EA framework
The modes comprising the organization level are a refinement the models developed at the scope level. For each element in the models of the scope level, a more detailed representation is given. Figure 7 shows what is included in the models representing this level.

For the data dimension, this means that for each data type selected at the scope level a representation is given of what it is composed of. The additional criterion used here is that the data included is relevant in the execution of the selected processes. Some data included in the model are not directly data itself, but rather contain data. Examples are documents such as plans and e-mails, which are carriers of data. Most of this data, however, is unstructured and is therefore not suitable to be processed by an IT system. The carriers of this information, however, can be. Therefore, they are included in the data model.

For the process dimension, the refinement means that for each selected process at the scope level, a detailed representation was made in terms of the sequence of process steps. In order to keep the models as simple as possible, the starting point was to include only process steps for which customer information was relevant input or output, excluding intermediary steps that are irrelevant for this research. After that, additional process steps were included in order to create logical models. In contrast with the original Zachman framework, the process flow diagrams at this level do not have a one-to-one relationship with a single dimension. The flow diagrams address the process dimension, but also overlap with the data and people dimension. The reason for this small deviation from the original Zachman framework is to link the data and people dimension with the process dimension. The link is operationalized by reflecting the data required for or produced in a process step in the flow diagrams, as well as the roles involved in each step. Linking the three dimensions was necessary, since not all data reflected in the data model plays a role in each process and not each role is involved in each process. This is in contrast with the other models, where the link between the different dimensions is more obvious.

For the people dimension, each entity selected at the scope level was refined in terms of departments and roles involved in selected processes. This is reflected in models that show the departments of the selected entities, including the roles fulfilled in each department. The models include only the departments and roles that are involved in the execution of the processes addressed in this research. The managers of the selected departments were excluded from this research, because they are occupied with controlling and coordinating the work of their respective department and are not directly involved in sales processes. In addition, if multiple departments exist that execute the same tasks but for a different region, only one department was included. This choice is legitimate since the create models are also applicable to the other departments.
The communication diagram developed at the scope level was further refined in another communication diagram, where the interactions between the selected entities are refined to the interactions between the different roles.

For those dimensions where differences occurred between the as-is situation and the to-be situation, different models for the organization level were developed. The models of the as-is situation reflect the current operation of the sales force, and the to-be situation reflects the improved operation of the sales force by means of the developed conceptual CRM solution.

**The system level of the EA framework**

At the system level, the models of the organization level were projected to the IT systems in place that support the sales representatives in the execution of their activities.

For the data dimension, this means that data models were developed for each system supporting the involved business processes. This is a projection of the data model of the organization level, showing which data is stored in which system. The data model of the organization level was taken as a starting point. The data which is not stored in any of the IT systems was not included in the data models of the system level. Where necessary, the data model was extended with data not included in the data model of the organization level in order to create consistency between the data models and the component interaction models. Also, where necessary, the data models of the system include a refinement of the data from the model of organization level, showing increased level of detail. This increased level of detail was considered necessary to provide the additional information required for a 360º view of the customer. Most IT systems contain more data than displayed in data models. However, this data was not considered relevant for this research and therefore, excluded from the model.

The process dimension at the system level is reflected in component function diagrams, showing the functionality of each system in place and how it supports the business processes at the organization level. The process flow models of the organization level were taken as the starting point to identify the functionality of the systems. Most systems have more components than displayed in the models. However, these components do not support the processes analyzed in this research and were therefore excluded from the model.

For the people dimension, each role involved was projected to the IT systems in place in order to show who has access to which system.

The network perspective of the system level is different from the other dimensions, since the models developed for this dimension is not related to the communication diagram of the organization level that shows the existing interfaces between the selected roles. Instead of interfaces between roles, the model developed for the network dimension of the system level display the interfaces between the IT systems, showing what information is exchanged by which systems. The interaction models only show interfaces where data is exchanged that is part of system data models.

For those dimensions where differences occurred between the as-is situation and the to-be situation, different system models were developed. The models of the as-is situation reflect the current operation of the sales force, and the to-be situation reflects the improved operation of the sales force by means of the developed conceptual CRM solution.
Developing the models of the EA framework

In order to be able to create the models describing the as-is situation, information was collected from multiple sources. First, interviews were held with multiple marketing and sales representatives from different levels of the organization and different PLs and BUs. This included interviews with PL Managers, Marketing Managers, Area Managers, Local Sales Managers (LSM), Key Account Managers (KAM), Technical Account Managers (TAM) and Sales Support Employees (SSE). Additionally, interviews were held with representatives of the ICT department and application managers to collect the information necessary to develop the models for the system level. Prior to the interviews, questions were prepared addressing each level and dimension of the Zachman framework applied in this research. The interviews were semi-structured, allowing new questions to be brought up during the interview as a result of what the interviewee said. The information collected from the interviews was complemented with available documentation (e.g. documented processes and procedures, policy documents and manuals) and the author’s own experience gained as an employee of SMES over the last four years. Based on this information, the models of the as-is situation were created.

During the same interviews as for the collection of the information for describing the as-is situation, interviewees were asked to indicate limitations, bottlenecks and inefficiencies that hamper or obstruct them in their activities. Together with the preliminary identified causes from figure 3 (section 1.1.3) this formed the starting point of the analysis of the causes of the inefficiency and ineffectiveness of the sales force. The second step concerned a thorough analysis of the models describing the as-is situation. This sequence provided clear insights in the causes of the inefficiency and ineffectiveness of the sales force, which were summarized and structured in an Ishikawa diagram.

Existing literature on CRM (mostly practical handbooks on CRM implementation, such as the book of Dyché, 2001 and Buttle, 2009) was reviewed to identify possible CRM practices and system functionalities useful to eliminate the causes that hinder the sales force efficiency and effectiveness. This analysis was complemented with possibilities suggested by interviewees during the previous mentioned interviews. Together, this information formed the input for the design of the to-be situation. The initial plan was to organize a workshop with multiple sales and marketing representatives to brainstorm about ideas for improving the efficiency of the sales force. However, due to the limited availability of the sales and marketing representatives, this was not feasible. Instead, a session with only two sales representatives from one BU was held. Based on the models of the as-is situation and the causes of the inefficiency of the sales force, and the outcome of this session, the models of the to-be situation were created.

For the as-is situation, the models of the organization level provide insight in how the sales force currently executes its activities, who plays which role, which data is involved and how information is exchanged with customers and internally. The models describing the system level show how the current IT systems support the sales force. Together, they give a comprehensive description of how the sales force currently operates. With this insight, an analysis of the bottlenecks causing the inefficiency of the sales force could be performed. Similarly, the models of the to-be situation give a comprehensive description of how the sales force could function more efficiently and effectively by means of an implemented CRM solution.

2.1.2 The applied survey for measuring MO and its antecedents

As already mentioned at the beginning of section 2.1, a survey was conducted to assess the level of MO and its antecedents. More specifically, the survey developed by Jaworski and Kohli (1993) was used. As part of their research, the authors developed a survey to empirically test
their proposed model of antecedents and consequences of MO. They found that top management commitment, interdepartmental dynamics and organizational systems represent antecedents of MO. The consequences of a high level of MO are increased firm performance and increased organizational commitment of employees. The survey they developed includes measurement scales for the different components of MO (intelligence generation, intelligence dissemination and responsiveness) and the antecedents mentioned before.

This survey was selected, because it allows measuring the level of MO as well as important antecedents of MO. The relevance of the antecedents measured with this survey has been confirmed by Kirca, Jayachandran and Bearden, who conducted a meta-analytical assessment of antecedents of MO (Kirca, Jayachandran and Bearden, 2005). Furthermore, this survey is widely used, and is one of the measurement scales that were analyzed by Deshpandé and Farley, who concluded that this survey can be used interchangeably with two other widely used scales to measure MO (Deshpandé and Farley, 1998). Deshpandé and Farley also confirmed that this survey is valid across different cultures and different industries.

The survey applied in this research included measurement scales for the constructs listed in table 1, which were adopted one-to-one from Jaworski and Kohli (1993). All scales included multiple items rated on a 5-point scale. A complete overview of the questions is included in appendix B.1. It is important to note that the survey published in their paper includes also measurement scales for other constructs. This concerns another antecedent and several constructs for the consequences of MO. This antecedent, however, appeared not to be related to MO, and was therefore excluded from the survey applied in this research. The consequences of MO were not measured, since they did not contribute to answering the research questions of this research.

<table>
<thead>
<tr>
<th>Market Orientation</th>
<th>Antecedents of Market Orientation</th>
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</thead>
<tbody>
<tr>
<td>1. Intelligence generation</td>
<td>4. Top management commitment</td>
</tr>
<tr>
<td>2. Intelligence dissemination</td>
<td>4a. Top management emphasis</td>
</tr>
<tr>
<td>3. Responsiveness</td>
<td>4b. Top management risk aversion</td>
</tr>
<tr>
<td>3a. Response design</td>
<td>5. Interdepartmental dynamics</td>
</tr>
<tr>
<td>3b. Response implementation</td>
<td>5a. Interdepartmental conflict</td>
</tr>
<tr>
<td></td>
<td>5b. Interdepartmental connectedness</td>
</tr>
<tr>
<td></td>
<td>6. Organizational systems</td>
</tr>
<tr>
<td></td>
<td>6a. Centralization</td>
</tr>
<tr>
<td></td>
<td>6b. Reward system orientation</td>
</tr>
</tbody>
</table>

Table 1 – constructs measured by the survey

In their research, Jaworski and Kohli applied a key informant approach, whereby the survey was sent to both a senior marketing or sales executive and a non-commercial executive of each BU. In order to make the results comparable to the findings of the Jaworski and Kohli, this key informant approach was also used in this project, with BU as the unit of analysis. In order to follow the same logic as used for the applied EA framework, the scope of the applied survey is explained in chapter 4 prior to the presentation of the results.

In order to increase the likelihood that the candidate respondents returned a completely filled-in survey, the required effort to fill in the survey was limited by using an online survey tool. Furthermore, the respondents were contacted by telephone in advance to explain the reason and purpose of the survey and to emphasize the necessity to return a completely filled-in
survey. When the respondent agreed, the survey was sent together with an instruction how to fill in the survey.

The assessed levels of MO of the different entities involved were compared both internally and externally. An internal comparison was made by measuring the level of MO at different BUs. In this way, the BUs, that are more market oriented then others, were identified. Besides that, an internal benchmark was established by calculating the average level of MO across all entities included in the analysis. Furthermore, comparing the scores of the BUs on the antecedents of MO enabled the determination of the inhibitors obstructing the organization in being more market-oriented. This, in turn, allowed for making recommendations for improving the level of MO. The external benchmark was developed based on the results of the survey, reported by Jaworski and Kohli (1993) in the same paper in which the survey was introduced. Their sample covered 222 BUs, all from the United States. Under the assumption that the level of MO followed a normal distribution, a norm was calculated using the reported mean score and standard deviation, by means of imputation. More specifically, using the cumulative normal distribution function, the average score of the top 25% of the BUs queried was approximated. A detailed calculation of the norm can be found in the appendix B.2.

2.1.3 Identification and formulation of the relationship between MO and CRM

As the literature review for this research revealed, the evidence provided by academics for the causal relationship between MO and CRM is rather weak, which gives rise to the revision of the relationship between MO and CRM. In order to reformulate the relationship, a thorough analysis of the definitions of both concepts was performed. The literature review revealed that both concepts are composed of multiple aspects. In order to get a clear understanding of both concepts, both definitions were decomposed into their different aspects. The aspects were then compared, in order to identify similarities and differences. Based on this analysis, the relationship between the two concepts was identified, which was then visualized in a model, which is presented in chapter 3.

2.2 Validation methods

This section covers the description of the validation processes applied in order to ensure correctness of the models developed, to assess the strength of the conclusions based on the results of the survey and to assess the correctness of the proposed relationship between MO and CRM.

2.2.1 Validation method for the developed models and identified causes

A single validation procedure was applied for the models of the as-is situation, the models of the to-be situation, and the identified causes of the inefficiency and ineffectiveness of the sales force. The models developed for the as-is situation were validated in order to prevent that the analysis of causes is based on faulty models, which could have led to the wrong conclusions in terms of causes. Due to the lack of availability of sales and marketing representatives, a thorough validation of the as-is models by means of plenary discussion with the interviewees was not feasible. Therefore, only the as-is models of which there was uncertainty about the correctness were validated by discussing these models with interviewees. If there was still any concern about the correctness of a model after the discussion and if it was possible, the model was discussed with another representative working for the same department to cross-validate the model.
As mentioned in section 2.1.1, an Ishikawa diagram was developed to summarize and structure the underlying causes of the inefficiency and ineffectiveness of the sales force. This diagram was validated to ensure that the causes identified are truly the causes of the inefficiency and ineffectiveness of the sales force and that the real problems are addressed by the solution. This increases the likelihood that the suggested solution will lead to an increase in efficiency and effectiveness of the sales force. Recall from the same section that, as part of the design of the to-be situation, a session was held with two sales representatives. The beginning of the session was used to discuss the Ishikawa diagram, which comprehended the validation of the causes underlying the inefficiency of the sales force.

As explained in section 2.1.1, a brainstorm session was held with two sales representatives to identify possible improvements. The models describing the to-be situation were validated in order to ensure that these models match the outcome of the brainstorm session. Since the creation of the models of the to-be situation was a translation of the outcome of this session into models on paper, it was considered sufficient to briefly discuss the models describing the to-be situation with one of the two participants of this session in order to check if this translation was done properly.

2.2.2 Validation method for the survey results

In following the approach of Jaworski and Kohli, the scores of the marketing or sales executives and non-commercial executives were averaged to derive the score for each construct. By doing so, a more complete measurement of the organizational characteristics was obtained, since the two key informants of each entity scored differently on items due to the difference in perspectives. In order to determine if this choice is justified, the congruence between the two key informants of all entities was assessed by calculating for each construct the average absolute differences in the ratings of the two informants. These values are an indication of the degree to which the respondents have similar views on the constructs measured in their BU. Small absolute differences indicate that the average of the two ratings is a reliable score of the organizational characteristics. The authors also calculated the correlation between the responses of the marketing or sales executives and non-commercial executives. However, due to the small sample size in this research, this would not give representative results.

2.2.3 Validation method for the relationship between MO and CRM

The concept of CRM and MO were both applied in this research in the same organization. In order to provide evidence for the proposed relationship between the two concepts, a validation procedure was executed based on the results of the application of the two concepts. The results of the method applied to develop a conceptual CRM solution and the method applied to assess the level of MO and its antecedents were used to identify similarities and differences between the two concepts.

The procedure consisted of three different steps. In the first step, items from the survey used to measure the constructs of analysis were reviewed and matched with artifacts of the conceptual CRM solution, which indicated that overlap exists between CRM and MO. In the second step, items from the survey used to measure the constructs of analysis were identified that were not addressed in the conceptual CRM solution. These examples indicated that MO is broader than CRM. The third step comprised the identification of artifacts from the conceptual CRM solution which could not be matched with items used in the survey. These examples would indicate that CRM is broader than MO.
3. Results of the applied EA framework

In this chapter, the results of the applied EA are presented. The chapter starts with a presentation of the models describing the EA of the sales force in the current situation. Next, the causes of the inefficiency and ineffectiveness of the sales force are described. In the last section, the models describing the EA of the sales force in the to-be situation are presented.

3.1 Results of modelling the as-is situation

The models of the as-is situation are discussed per level, addressing each dimension separately. Firstly, the models of scope level are discussed, followed respectively by the organization level and systems level. For most models, the applied modeling technique is UML or tables. The UML (Unified Modeling Language), a standardized modeling language in the field of software engineering, was selected because it is widely used and easy to understand. Tables were used because they are very effective to present simple relations between elements. When another modeling technique is used, then this is explained in the respective section.

3.1.1 As-is – Scope level

As a first step to limit the scope of the research to a manageable size, the choice was made to focus only on the dredge market, which includes six of the twelve PLs. This choice is justified, since there is no overlap in customers in dredge market and customers in the offshore market. Respectively, the data dimension, process dimension, the people dimension and the network dimension are discussed, starting with a motivation of the choices made to further narrow the scope of the research, followed by the model resulted from these choices.

As-is – Scope level: Data dimension

The data types covered in this research are shown in table 2.

<table>
<thead>
<tr>
<th>Relevant types of data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer profile data</td>
<td>Data characterizing the customer</td>
</tr>
<tr>
<td>Customer request data</td>
<td>Data related to requests from the customer</td>
</tr>
<tr>
<td>Customer activity data</td>
<td>Data related to customer activities</td>
</tr>
<tr>
<td>Sales pipeline data</td>
<td>Data related to leads, quotations and sales orders</td>
</tr>
</tbody>
</table>

Table 2 – Scope: Selected data types

As-is – Scope level: Process dimension

Table 3 shows the sales pipeline covering all the activities in the product life cycle, from sales planning to customer support. Note that with customer support, non-technical support is meant. Technical support is offered during two phases in the product life cycle: the warranty service phase and the post-warranty phase. In the latter, technical support is offered as a separate after sales product that SMES offers. Therefore, the post-warranty phase is included in the table as a row, and not as a column. This is reflected in the in table 3 as the after sales product ‘service’, for which the complete sales pipeline applies as well.

<table>
<thead>
<tr>
<th>Product</th>
<th>Phases of sales pipeline</th>
<th>Sales Planning</th>
<th>Lead Management</th>
<th>Offering</th>
<th>Ordering</th>
<th>Design &amp; Production</th>
<th>Warranty Service</th>
<th>Customer Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>New build</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>New parts</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>After sales</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>spare parts</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>service</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 3 – Scope: Selected activities
The cells reading ‘Yes’, are the processes included in this research and the cells reading ‘No’ are excluded from the research. As can be seen, the design & production phase was not included. Interaction with customers does take place here, but since the sales representatives do not play a crucial role in this phase, it was excluded from the project. The same applies for the warranty service phase. However, since close interaction takes place in this phase with the actual end users, it is considered as a valuable source of information. Therefore, this was included in the research. The same argument could be raised to include the production phase of the service products. However, due to the major similarities between the execution of technical service (as a product) and the technical service as a warranty service, only one of the two processes was included. The customer support phase for complete new build vessels is not included, because it is not an activity performed by the sales force. Incoming requests for non-technical support related to new build vessels are directly forwarded by the sales force to the department which is able to respond to the request. Questions regarding payments, for example, are directly forwarded to the contract administration department. This resulted in the high level process model displayed in figure 8. The modeling technique used is a simple, non-specific technique to display the sequence of processes.

As-is – Scope level: People dimension
The PLs form the core of the organization as they are responsible for their product segment, in terms of turnover and results. The other entities fulfill a relevant function for the PLs. Firstly, the Area Management, which operates in the BU SMES Head Quarter, is responsible for all sales activities concerning new build vessels. This means that the PLs depend on the Area Management for the sales of new build vessels. Therefore, the BU SMES Head Quarter was selected.

Secondly, the PLs depend on SMES Components for the sales of new build dredge parts and for the sales in the aftermarket. SMES Components is a BU in the Technology division which offers dredge installations and dredge components to the PLs for new build vessels, and offers spare parts and services directly to the external customers. This BU has its own sales force which is responsible for all the sales activities related to new build parts, complete dredge installations, spare parts and services. It has to be mentioned that SMES Components is not the only BU supplying to the PLs and serving the aftermarket. Other BUs in the Technology division fulfill this function as well, but for different products. However, from a practical point of view it was not possible to take more BUs into account in this project, since the amount of models to be developed would increase exponentially with the inclusion of each extra BU. Since plans are being made to make SMES Components the only BU serving the aftermarket, which implies that it will also be responsible for the sales of other than its own products in the aftermarket, this was
considered as the most important BU in the Technology division. Therefore, SMES Components was included in the research.

Thirdly, the arranty service function is fulfilled by the Warranty department of SMES New Build which is the BU that used to be responsible for the design and delivery of Trailing Suction Hopper Dredgers and self propelled Cutter Suction Dredgers, prior to the implementation of the new PL structure. With the implementation of the PLs, the departments of marketing, product development and design & estimation are operating within the PLs Standard Hoppers and Custom Built Hoppers. Legally, however, they are still part of SMES New Build. A similar construction applies for the departments of engineering, production, project management and supply chain management: operationally they are now part of the shared resources available for all PLs; legally they are part of SMES New Build. The reason for including this entity in the project is that it offers the shared source to all PLs for the warranty service activities, which were selected in the previous section. The red parts in figure 9 show the organizational functions that operate in the legal entity SMES New Build. Note that this figure has the same structure as figure 2 in chapter 1.

![Figure 9 – Organizational functions of SMES New Build](image)

Only two out of the six PLs serving the dredge market were included in the research in order to simplify the models created for this research. However, since the sales processes, the role of the PL manager in these processes, the roles of the other representatives, the data structure, and the communication structure are equal for all PLs the developed models are also applicable to the other PLs serving the dredge market. The reason to select the PLs Standard Hoppers and Custom Build Hoppers is that they also operate in the BU SMES New Build, just as the shared source for warranty service activities. The resulting model is shown in table 4.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMES Head Quarter</td>
<td>Business Unit responsible for sales of new build vessels</td>
</tr>
<tr>
<td>SMES New Build</td>
<td>Business Unit offering shared sources for new build activities and the legal entity in which the PLs Standard Hoppers and Standard Cutters operate.</td>
</tr>
<tr>
<td>SMES Components</td>
<td>Business Unit responsible for sales and supply of dredge installations, spare parts and services</td>
</tr>
<tr>
<td>PL - Standard Hoppers</td>
<td>Operational entity responsible for the complete product life cycle of standard hoppers</td>
</tr>
<tr>
<td>PL – Custom Built Hoppers</td>
<td>Operational entity responsible for the complete product life cycle of custom built hoppers</td>
</tr>
<tr>
<td>Customer</td>
<td>Buyer of the products SMES offers in the dredge market</td>
</tr>
</tbody>
</table>

Table 4 – Scope: Selected entities
As-is – Scope level: Network dimension
All possible interactions between the entities selected for this research were addressed. This resulted in the UML collaboration diagram displayed in figure 10, which shows these interactions. The black lines show the interactions taking place internally. As can be seen from figure 10, each entity interacts with the customer and with each other entity. The external interactions with the customer are also visualized, indicated by the red lines. It is worth mentioning that it is possible that a single customer interacts with all the other presented entities. This stipulates the complexity of the sales force of SMES. The position of the customer in figure 10 has no specific meaning.

![UML collaboration diagram of the selected entities](image)

3.1.2 As-is – Organization level
In this section, each dimension of the organization model is separately addressed, starting with the data dimension, followed by the people dimension, the process dimension, and finally the network dimension.

As-is – Organization level: Data dimension
A UML class diagram was developed to represent the data perspective at the organization level. It shows a structured overview of all relevant customer data and their interrelations. As defined at the scope level, the involved data types are customer profile data, customer activity data, customer request data and sales pipeline data. The customer profile data includes the customer’s business model, organizational structure, decision criteria, decision making unit (DMU), clients, sales behavior, fleet and projects, and the customer investment plans. Customer activity data includes dredge projects, ship dockings and contact events. The latter type consists of customer visits, service jobs and e-mails. Customer request data includes Request for Quotations (RFQs), Request For Orders (RFOs), questions, complaints and claims. Sales pipeline data covers (possible) leads, quotations and sales orders. Also included in the model, but not directly attributable to a single data type, are tasks. These are tasks to be executed by SMES representatives, in order to respond to a lead or a request. This information is included, because an overview of actions relating to a single customer is necessary in order to have a 360° view of that customer. The resulted UML data diagram is included in appendix C.2.

As-is – Organization level: People dimension
Now, the departments and roles that play a role in the selected processes are presented. The technique used is organization charts, which is an effective technique to show the dependency between departments and roles. Figure 11 shows the organization chart of the Area Management.
The Area Managers fulfill a central role in the sales activities related to new build vessels. Each Area Manager operates in a specific region and is the first contact towards the customers in his region. Their primary job is to identify sales opportunities and initiate customer contact. Besides that, their job is to redirect customers to the appropriate BU for products other than new build. The Area Manager is also responsible for the set up and execution of an annual sales plan for his region.

The Area Management is supported by the Central Sales Secretary, where the Central Sales Office Employees take chart of all the administrative tasks related to the activities of the Area Management. Furthermore, the secretary administers the central phone number and central e-mail address of SMES.

Agents are local, external representatives looking after the interests of SMES and are indispensable for the organization. An agent speaks the local language, understands the culture and politics in the region and knows the local market. Furthermore, his local network of contacts, such as representatives of ministries, can be of great added value. He generates leads, accompanies customer visits, and follows up on customer visits. Since agents are contracted by the Area Management, but are external to the organization, they are depicted in figure 11 with a dotted square. The organization charts of SMES Components, the PLs and Warranty are included in appendix C.3.

As-is – Organization level: Process dimension
Process flow diagrams were developed for the activities selected for this project, which show the different steps taken in each process. The modeling technique used is RASCI, complemented with syntactic rules. The RASCI modeling technique is widely used within SMES to model processes including the relevant input and output, as well as the responsibilities of the involved roles. Using this technique enhanced the ease of communication within the company, since company representatives are familiar with RASCIs. Furthermore, it allowed for the inclusion of data flow and responsibilities. Additional syntactic rules, such as AND-splits, OR-splits, single start and end points, and a distinction between process flow and information flow, were included to increase the pragmatic quality of the models for this research. Due to the difference in nature between new build and after sales activities, there are also differences in the processes describing the different activities. Several processes, however, show substantial overlap. In order to limit the amount of process flow diagrams, the overlapping processes were combined into a single process flow diagram where possible. The flow of relevant customer information and the roles involved in each step are included in the process flow diagrams and thereby form a link to the data and the people dimension. Figure 12 shows the process flow diagram of the sales planning process.
The sales planning process is concerned with both new build and after sales. Yearly, all Area Managers, LSMs, and KAMs, write a sales plan for the following year. The Area Manager’s focus is on new build in his specific area, the LSM’s focus on the after sales market in his region, the KAM focuses on a single customer, and the AM focuses on a group of customers. These plans include a thorough analysis of the market, including aspects such as trends in the market in the area or region, SMES’s market position, competitor analysis, customer profile and customer’s investment plans. Based on this analysis, a specific sales approach is written, including sales targets and a planning of sales and marketing activities. The plans are sent by e-mail to other sales representatives on a need-to-know basis. A description of the other processes and the respective process flow diagrams are included in appendix C.4, as well as a legend explaining the notation. The relationship between the process flow models and the high level process model from figure 8 is depicted in figure 23 in appendix C.1.

Figure 12 – As-is: Process flow diagram of the ‘Sales planning’ process
As-is – Organization level: Network dimension
In order to reduce the complexity of the UML collaboration diagram of the organization level, only five SMES roles and four customer roles were included. The resulted model is depicted in figure 13 and shows the interactions between SMES and a single customer in the dredge market. It includes two kinds of interactions: internal interactions between different SMES roles (indicated in red) and external interactions between SMES representatives and the customer (indicated in black). Note that this is not one-to-one applicable for each customer. Small customers, for example have a more simple structure with less different roles. The amount of contacts on the side of SMES, however, is the same for each customer.

As can be seen, both the customer and SMES have a layered structure. This layered structure is the result of different DMUs on the customer side for different kind of products. On the other hand, at the side of SMES, different roles have different fields of expertise that match with the different layers at the customer side. The field of expertise of the Area Manager, for example, is sales of new build vessels. He interacts with the DMU for new build vessels on the customer side. This could be the Manager New Build or the board of directors (not included in the model). The LSM, in its turn, interacts with the DMU on the customer side for spare parts and service jobs. For large orders of spare parts, for example, this could be the Fleet Manager if the spare parts are intended for multiple vessels. For small orders, on the other hand, the Technical Superintendent, who is responsible of the technical state of a ship, would be the DMU. For service jobs, the Technical Superintendent’s contact person is the TAM. Figure 13 also displays the role of agent. His role is crucial, since a substantial part of the communication taking place between SMES and the customer is via the agent. The agent acts on behalf of SMES, but is an external party. Therefore, the agent is placed between SMES and the customer in figure 13.

The result is a complex communication structure, where multiple sales representatives interact with the same customer representative. With only five roles of SMES modeled and four roles of the customer, already nine external interactions exist. Taking into account that some roles are
fulfilled multiple times (a Technical Superintendent for each vessel or multiple PL Managers) and the limited amount of roles modeled on both sides, the amount of external interactions with a single customer could range up to more than 50. The same applies for the internal interactions. Looking at the model in figure 13, every representative interacts with every other representative, with the exception of the TAM. The amount of internal interactions also grows exponentially with each representative added to the model.

3.1.3 As-is – System level

Table 5 presents an overview of the relevant IT systems currently in place supporting the sales force. Each dimension of the applied framework is now separately addressed, starting with the process dimension, followed by the data dimension, the network dimension and finally the people dimension. Figure 23 in appendix C.1 shows an overview of which systems support which processes in the current situation.

<table>
<thead>
<tr>
<th>System</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HARP</td>
<td>ERP system of SMES Components</td>
</tr>
<tr>
<td>SMART</td>
<td>ERP system of SMES New Build</td>
</tr>
<tr>
<td>Accountview SMES Components</td>
<td>Accounting system of SMES Components</td>
</tr>
<tr>
<td>Accountview SMES New Build</td>
<td>Accounting system of SMES New Build</td>
</tr>
<tr>
<td>Outlook</td>
<td>Personal information manager system</td>
</tr>
<tr>
<td>Intranet</td>
<td>Internal network used to securely share information</td>
</tr>
<tr>
<td>ii-Desk</td>
<td>Web-based application used by Warranty to plan the service engineers</td>
</tr>
<tr>
<td>SMES Components complaint database</td>
<td>Database to register customer complaints</td>
</tr>
<tr>
<td>Claim Registration Program</td>
<td>Database developed by Warranty to register claims</td>
</tr>
<tr>
<td>Hyperion</td>
<td>OLAP tool used to perform data analyses</td>
</tr>
</tbody>
</table>

| Table 5 – Relevant IT systems for the as-is situation |

As-is – System level: Process dimension

For each relevant IT system, a UML component diagram was developed to present the functionality of each system. The UML component diagram in figure 14 shows the functionalities of HARP, which is the ERP system used by SMES Components. This system supports the offering process for new build parts and after sales, if the process is executed in The Netherlands. The same process is executed by the Local SMES Office (LSO) in India, but without the support of HARP. Instead, quotations and orders are processed by office application systems and stored on the local network drive. Due to the relatively small amount of orders processed by the LSO in India, the added value of working with the ERP system is limited. As soon as the stream of orders processed by the LSO in India is large enough, they will start to work with HARP and have their own HARP database.

![Figure 14 – As-is: UML Component diagram of HARP](image)

The ordering component is used to create quotations and sales orders. The workflow management component supports the coordination of processing quotations and sales orders.
The reporting component can be used to run different kinds of analyses, for example sales order analyses.

Appendix C.5 contains UML component diagrams of Accountview, the Claim Registration System, Hyperion and MS Outlook. SMART, the intranet, ii-Desk and the SMES Components complaint database are just databases and have no functional components that process data, or their functionalities are not supportive to the processes analyzed in this research. Therefore, there are no component function models of these systems.

**As-is – System level: Data dimension**

For each relevant IT system, a UML class diagram was developed which shows what data is stored in the respective system. The UML class diagram in figure 15 displays the data stored in HARP.

![Figure 15 - As-is: UML data class diagram of HARP](image)

The central data class depicted in figure 15 is the class ‘Sales Order’. Each sales order consists of one or more sales order lines which correspond to certain product. The sales order can also have the status of quotation, which means that all quotations are also stored in HARP. Each sales order is linked to a customer selected from the customer list. Furthermore, HARP contains a list of objects which includes, amongst others, ships and maintenance contracts. These objects are linked to customers and can therefore also be connected to sales orders. The data classes ‘Invoice’ and ‘Journal entry’ were included, because this data classes are essential in the link between HARP and accounting system Accountview. This is explained in more detail when the network dimension is discussed.

The UML class diagrams of Accountview, Claim Registration Program, Outlook, Intranet, ii-Desk, SMES Components Complaint Database and SMART are included in appendix C.6. Since Hyperion uses other databases to retrieve data and contains no data itself, no UML class diagram was made of this system.
As-is – System level: Network dimension
In order to model the interrelationships between the IT systems, UML component diagrams were developed. Figure 16 displays the UML component diagram reflecting the interfaces between HARP and the Accountview database of SMES Components.

![UML component diagram of interfaces between HARP and Accountview SMES Components](image)

Figure 16 – As-is: UML component diagram of interfaces between HARP and Accountview SMES Components

The journal entries in HARP, that represent the amount of money a customer has to pay for a sales order, are imported by Accountview, which processes the transactions. In this way, the money transactions are automatically related to the sales orders created in HARP. This enables the reporting component of Accountview (see figure 39 in appendix C5) to generate overviews of the status payments of the sales orders in HARP. Since the journal entries in HARP are one-to-one imported by Accountview, they had to be included in the UML class diagram of HARP (figure 15) in order to make that diagram consistent with the UML component diagram in figure 16. Accountview contains no customer database and therefore, basic customer information, such as the customer ID and customer name, is imported from HARP, in which the customer database of SMES Components is maintained. The interfaces that HARP has with other systems are not modeled, since these systems were not considered relevant for this research. The UML component diagrams reflecting the interfaces between the other systems are included in appendix C.6.

As-is – System level: People dimension
The people dimension of the system level was addressed by reflecting the accessibility of the different systems for the different representatives involved in this research. Combining this knowledge with the data model of the systems, one has insight into which information can and which information cannot be accessed by each representative. Table 6 shows which representatives have access to HARP.

<table>
<thead>
<tr>
<th>Role</th>
<th>Access to HARP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area Manager</td>
<td>No</td>
</tr>
<tr>
<td>Agent</td>
<td>No</td>
</tr>
<tr>
<td>Central Sales Office Employee</td>
<td>No</td>
</tr>
<tr>
<td>PL Manager</td>
<td>No</td>
</tr>
<tr>
<td>Marketing Manager PL</td>
<td>No</td>
</tr>
<tr>
<td>Local Sales Manager</td>
<td>Yes</td>
</tr>
<tr>
<td>(Key) Account Manager</td>
<td>Yes</td>
</tr>
<tr>
<td>Technical Account Manager</td>
<td>Yes</td>
</tr>
<tr>
<td>Sales Support Employee The Netherlands</td>
<td>Yes</td>
</tr>
<tr>
<td>Sales Support Employee India</td>
<td>No</td>
</tr>
<tr>
<td>Project Manager TS</td>
<td>Yes</td>
</tr>
<tr>
<td>Project Leader Warranty</td>
<td>No</td>
</tr>
<tr>
<td>Field Engineer Warranty</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 6 – Roles with access to HARP
As can be seen from table 6, only the representatives of SMES Components have access to HARP, with the exception of the SSE in India. This is not surprising, since HARP is the ERP system of this BU. Since HARP does not support the offering process for new build parts and after sales executed in the LSO in India, the SSE in India has no access. The component access table in appendix C.8 gives a complete overview of the accessibility of the different systems for each representative involved.

### 3.1.4 Validation of the models of the as-is situation

The validation procedure described in section 2.2.1 led to multiple changes in the different models that were validated. Some examples are the addition of the role ‘ship personnel’ to the collaboration diagram of the organization level, a change in the information flow in the process flow diagram of the process ‘preparing visit to customer’, and the addition of the data class ‘invoice’ to the data model of HARP. Models that were not validated include organization charts, multiple process flow diagrams and the system models of MS Outlook and the SMES Components Complaint Database. The organization charts were not validated because they were derived from documented organization charts available in the organization. The process flow models were also partly based on documented process models and procedures. Still, there was uncertainty about the correctness of several models, of which some were validated. However, due to the lack of availability of sales representatives, not all models could be validated. This concerns especially the models representing the activities performed by the central sales office. These models, therefore, need to be interpreted with caution. Furthermore, the validity of multiple process models remained questionable after validation due to differences in the way activities are performed. As a result from the low level of formalization within the organization, processes are not standardized and the way processes are executed varies per representative. Therefore, a single model that exactly describes the process does not exist. These models, therefore, also need to be interpreted with caution. Due to the extensive user experience with MS Outlook, there was no uncertainty about the correctness of the models describing this system. Due to the low complexity of the SMES Components Complaint Database, there was also no uncertainty about the correctness of the models regarding this system. Table 14 in appendix C.9 gives a complete overview of which models were validated and which not.

### 3.2 Results of the analysis of causes

The analysis of the models of the as-is situation covered multiple sub analyses, revealing different kinds of causes. Each step of the analysis is now separately discussed, including the outcome of each step and one or more examples illustrating the inefficiency or the ineffectiveness of the sales force. Finally, all causes are structured and summarized in an Ishikawa diagram.

From a comparison of the data model of the organization level with the data models of the system level, few data were identified which were included in the model of the organization level, but not included in any of the data models of the system level. This indicated that most of the relevant customer data is registered in at least one of the IT systems, but that there is also relevant customer data which is not registered. Furthermore, none of the IT systems contains all the registered customer data, which means that the relevant customer information is spread out over the different IT systems in place. The analysis of component access table, in turn, revealed that none of the sales representatives has access to all IT systems, which means that, due to the decentralized registration, none of the sales representatives has access to all relevant customer data. Complaints directed at SMES Components, for example, are registered in a database only accessible for a limited number of sales representatives. Consequently, Area
Managers and PL Managers, for example, have no access to this data. The same applies to sales pipeline data, which is only available for the departments processing them. Examples of relevant customer data which are not registered are RFQs and RFOs concerning after sales. These are directly translated into sales orders in HARP and the original requests are not registered. This means that the RFQs and RFOs which are refused by the company are miscarried. These requests, however, can provide useful insights in what the market requires.

The analysis of the data models of the system level also revealed redundant data. That is, the same relevant customer information is stored in different IT systems. These data were compared with the data exchanged between the different IT systems, which are reflected in the component interaction models. For several data which are stored in different IT systems, no interface exists between these systems through which these data are exchanged. This means that this data is registered and maintained independently in multiple systems, which results in additional manual work and an increase of the possibility of errors and outdated information. The fleet list, is an illustrative example of redundant customer data. The fleet list is maintained in HARP. Since only representatives of SMES Components have access to this system, the list is periodically exported and placed on the intranet to share this data with other representatives. This list, in turn, used to import the list of vessels into the Claim Registration Program.

The process flow diagrams were reviewed to identify process steps that require a considerable amount of effort or time, hampering the efficiency of the sales force. This review showed that there are multiple process steps which are concerned with the manually performed tasks or with the manual collection of data. These steps require substantial effort which could be easily automated. This is illustrated by the flow diagram of the ‘preparing visit to customer’ process (figure 30). The diagram shows that, for the preparation of a customer visit by the KAM, it the SSE and the controller are requested to provide an overview of respectively the status of quotations and complaints, and the status of payments. In parallel, the KAM retrieves the fleet list and dredge project list himself from the intranet. So, in order to collect the relevant customer data prior to a customer visit, effort from multiple representatives is required, due to the decentralized registration of customer data. Another example is the manual creation of quotations by the Central Sales Office and LSO India.

The review of the process flow diagrams was also used to identify the way of sharing information with other representatives. This first observation is that e-mail is the most commonly used medium to share relevant customer information which leads to substantial e-mail traffic. Such e-mails might not be relevant at the time of receiving, but at the time it becomes relevant, the e-mail is already forgotten and ignored. The intended message is then transferred to the appropriate sales representative, but not received. Examples of relevant customer information which is shared by e-mail can be found in the flow diagram of the ‘visiting customer’ process, which shows that the visit reports are shared via e-mail. Also, the flow diagrams of lead management processes reveal that leads are frequently passed on to the appropriate sales representatives by mail. The second observation is that information is often not shared at all. The flow diagram of the process ‘visiting customer’ (figure 29 in appendix C.4) shows that the sales representative checks his personal calendar to plan the visit, but is not provided with information about customer visits by other representatives. This led to situations where different sales representatives visited the same customer quickly after each other, without being aware of the other visit. This does not lead to any problems, but can result in awkward situations and harms the reputation of the company.

An analysis of the component function models, which was performed to identify the extent to which each system supports the sales processes, showed that several systems in place offer
limited functionality and that they are merely used to register relevant customer information. In
the first place, sales representatives are forced to execute tasks which could easily be
performed by a smarter IT system. Secondly, as was stated by multiple interviewees, this limited
functionality withholds representatives to use these systems, because the effort required to
register the information does not pay off in terms of support that the representatives get from the
systems after registering the information. From the models describing the SMES Components
Complaint Database (figure 48 in C.6), it becomes clear that the system only allows for
registration of complaints and claims and offers no functionality. Due to the limited functionality
the system is hardly filled by SSEs. The result is that not all complaints are registered, as well
as the information related to these complaints.

From the discussion of the collaboration diagram of the organization level in section 3.1.2 it
becomes clear that the amount of different SMES representatives interacting with a single
customer can range up to twenty. Recall from section 3.1.2 that the sales force of SMES has a
multi-layered structure, where each sales representative has its field of expertise that matches
with the appropriate DMU of the customer. This is, however, based on the larger customers who
have multiple DMUs also structured in multiple layers. For small customers with less DMUs,
each customer representative has to interact with multiple representatives of SMES. This
hampers the customer to establish an efficient and consistent dialog with SMES. One of the
interviewees provided an example of a missed opportunity regarding a potential new customer,
because this customer never got any response on a request.

Besides the causes identified from the models describing the as-is situation, two important
causes of the inefficiency and ineffectiveness of the sales force were identified from the
interviews which do not become clear from the models. The first is the low level of formalization
when it comes to communication with the customer. This leads to confusion, both internally and
for the customer. This is illustrated by an example given by one of the interviewees, who
explained that for a specific issue the customer had with one of its vessels, five different
representatives of SMES communicated with the customer about the progress. At a certain
point, the customer received conflicting answers from different representatives, which shows
that both the customer and SMES representatives were not informed correctly. Although this is
most likely the result of the lack of formalization and the organic way of doing business, the IT
systems in place do not offer support to come to a single, consistent dialog with the customer.
Secondly, during the discussion of the process flow diagrams, multiple interviewees indicated
that several process steps are often not executed. Visit reports, for example, are regularly not
written and/or not shared with the other relevant sales representatives. A commonly heard
response is that the respective sales representative does not see the added value of writing and
sending the report, since he believes that no one reads the report. By doing so, the sales
representative ignores the fact that other sales representatives miss relevant information that he
acquired, which is against the customer’s interest. This is reflected in the Ishikawa diagram by
the label ‘poor customer focus’.

The results of the analysis of the causes of the inefficiency and ineffectiveness of the sales
force are summarized and structured in the Ishikawa diagram figure 17. Three main causes
where identified are (1) the incomplete view of the customer; (2) the poor coordination of
activities; and (3) the inefficiency of the processes. Each main cause has again several
underlying causes, of which some relate to more than one main cause. The decentralized
registration of customer data, for example, is a cause of the incomplete view of the customer,
because not all sales representatives have access to all systems. On the other hand, the
decentralized registration also makes the sales processes inefficient, because the collection of
the necessary customer data requires considerable effort from different representatives.
3.3 Results of modelling the to-be situation

In accordance with the applied framework and with the structure of section 3.1, the models of the to-be situation are discussed per level. Per level, in turn, each dimension is separately addressed. First, the models organization level are discussed, followed by the models describing the system level. The applied modeling techniques are the same as the techniques used to model the as-is situation.

3.3.1 To-be – Organization level

Each dimension of the organization level is separately addressed, starting with the data dimension, followed by the people dimension, the process dimension, and finally the network dimension.

To-be – Organization level: Data dimension
As became clear from section 3.2, the problem of the inefficiency and ineffectiveness of the sales force regarding customer information is that not all relevant information is registered and that most relevant customer information is registered decentralized. There is no customer data that appears relevant for the sales force which was not included in the data class diagram of the organization level reflecting the as-is situation. Therefore, no new data model was developed for the organization level of the to-be situation. In other words, the UML class diagram of figure 24 in appendix C.2 is also applicable to the to-be situation.

To-be – Organization level: People dimension
The analysis of the causes of the inefficiency and ineffectiveness revealed that none of the causes is related to the roles fulfilled by the different representatives or their place in the organization. Therefore, no changes in the organization charts of the as-is situation were required. The organization charts in figure 25, figure 26 and figure 27 in appendix C.3 also apply to the to-be situation.

To-be – Organization level: Process dimension
The process flow diagrams of the to-be situation differ substantially from the process flow diagrams of the as-is situation. Differences include, amongst others: different flow of information
due to centralized registration (e.g. complaints, leads and sales plans); more flow of information
due to registration of more customer data (e.g. RFQs and leads for after sales) and less manual
process steps due to automation (e.g. collection of relevant customer data prior to a customer
visit, creation of quotations with support of CRM system instead of creating them manually).

Figure 18 shows the process flow diagram of the 'sales planning' process of the to-be situation. In comparison to the as-is situation (figure 12 in section 3.1.2), the following changes have been made: Firstly, the collection of relevant customer data is simplified. Due to the central registration of customer data, a single source suffices to retrieve all the relevant input for writing the new sales plans. In this way, it requires less effort to collect all the required information. This addresses the problem of the decentralized registration, indicated by as cause 1.3.1 in figure 17. Secondly, instead of sharing the sales plans via e-mail, the sales plans are uploaded to a central location, which all the relevant sales representatives can access. This limits the selective and ineffective sharing of customer information via e-mail (cause 1.1 in figure 17). Thirdly, tasks can be created, assigned and monitored via the CRM system. This increased formalization enables the responsible sales representative to manage and coordinate the tasks resulting from the sales plan in an effective and efficient way (cause 2.1 in figure 17).

All process flow diagrams where affected by the suggested changes. The process flow
diagrams of the to-be situation are included in appendix D.2, as well as a list of differences
between the process descriptions of the as-is situation and the to-be situation.
To-be – Organization level: Network dimension

One of the causes of the inefficiency and ineffectiveness of the sales force is the amount of contacts for small customers, which does not match with the amount of DMU of these customers (cause 2.2 in figure 17). This problem can be resolved by adapting the amount of contacts for each customer to the organizational structure of that customer. The UML collaboration diagram in figure 19 shows the communication structure for a smaller customer with less contact points, where only five external interactions exist.

![UML Collaboration diagram of the organization level](image)

3.3.2 To-be – System level

Table 7 presents an overview of the relevant IT systems that support the sales force in the to-be situation. As can be seen, two systems appear relevant for the to-be situation which are not included in the as-is situation. Firstly, a CRM system is envisioned which enables the sales force to become more efficient and effective. Secondly, the SMES Components web portal is included. In contrast to the two new systems, the intranet and SMES Components Complaint database will no longer be relevant in the to-be situation. Each dimension of the applied framework is now separately addressed for the CRM system and the SMES Components web portal, starting with the process dimension, followed by the data dimension, the network dimension and finally the people dimension. Figure 52 in appendix D.1 shows an overview of which systems support which processes in the to-be situation.

<table>
<thead>
<tr>
<th>System</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HARP</td>
<td>ERP system of SMES Components</td>
</tr>
<tr>
<td>SMART</td>
<td>ERP system of SMES New Build</td>
</tr>
<tr>
<td>Accountview SMES Components</td>
<td>Accounting system of SMES Components</td>
</tr>
<tr>
<td>Accountview SMES New Build</td>
<td>Accounting system of SMES New Build</td>
</tr>
<tr>
<td>Outlook</td>
<td>Personal information manager system</td>
</tr>
<tr>
<td>ii-Desk</td>
<td>Application of Warranty used to plan service engineers</td>
</tr>
<tr>
<td>Claim registration system</td>
<td>database developed by Warranty to register claims</td>
</tr>
<tr>
<td>Hyperion</td>
<td>OLAP tool used to perform data analyses</td>
</tr>
<tr>
<td>CRM system</td>
<td>Customer Relationship Management System supporting the sales force</td>
</tr>
<tr>
<td>Web portal</td>
<td>web portal allowing customers to place orders and retrieve relevant information</td>
</tr>
</tbody>
</table>

Table 7 – Relevant IT systems for the to-be situation
To-be – System level: Process dimension

Figure 20 and 21 display the UML component diagrams of the CRM system and the SMES Components web portal. The components of both systems are now discussed, starting with the CRM system.

The account management component of the CRM system provides a high level overview of all relevant customer data included in the data model of organization level. From this high level overview, one can zoom in on a specific type of customer data (e.g. all sales pipeline items). In this way, the problem of the decentralized registration is addressed (cause 1.3.1 in figure 17).

The Pipeline management component provides an overview of complete sales pipeline and allows managing the entire sales cycle from lead to warranty service by keeping track of all leads, quotations and orders. This component also contributes to the creation complete overview of the customer (cause 1.3.1 in figure 17). Furthermore, this component enables the sales representatives to perform won-loss analyses which reveal insight into the performance of the sales force. In the current situation, such analyses cannot be made. This increased customer intelligence does not contribute to any of the causes of figure 17, but contributes to a better understanding of the customer. An increased understanding of the customer leads to a more effective sales force. Therefore, this function is considered relevant for SMES.

The case management component offers the function to create a digital file for a request (e.g. complaint; service issue, etcetera). Relevant information can be registered such as involved stakeholders, tasks related to the request, customer interactions related to the request, and relevant documents can be attached. This component allows for better coordination of customer inquiries by sharing related information (cause 2 in figure 17) and enables a single consistent dialog with customer (cause 2.1 in figure 17).

The task management component allows sales representatives to create, assign, and monitor tasks in order to keep track of the obligations related to customer requests. In this way, tasks from different sales representatives related to a single request can be better coordinated (cause 2.1 in figure 17).

The offering component supports the creation of quotations, which makes the offering process performed by LSO India and by the central sales office more efficient. It replaces the manual
creation of quotations (cause 3.3 in figure 17) and simultaneously stores the quotations in the CRM system and updates the sales pipeline, which contributes to the creation of a 360° view of the customer (cause 1 in figure 17).

The scheduling component supports the sales force by providing an overview of all relevant customer-related events, such as dredge projects, dockings, service jobs and customer visits (cause 1 in figure 17). It contributes to the creation of a complete overview of the customer, as well as the coordination of activities performed by the sales force, such as customer visits (cause 2 in figure 17).

The informing component sends messages to sales representatives about updates in the CRM system, based on the preferences of the representative. It addresses the problem of the ineffective and inefficient sharing of customer information via e-mail (cause 1.1 in figure 17). In this way, representatives can choose themselves about which changes in the CRM system (e.g. new claims, new leads, and new orders) they want to be informed about, instead of getting overloaded with unsolicited e-mails.

The market sizing component contributes to the improved efficiency of the sales force, by providing direct access to market size model used by sales representatives to write their sales plans. Currently, this model is not accessible for representatives and they get their required information on request (cause 3.3 in figure 17).

The reporting component supports the sales force by providing a variety of predefined reports, such as won-loss analyses, pipeline status, transaction history and status of payments. This leads to both increased efficiency by making this information directly available for sales representatives (cause 1 and cause 3 in figure 17) and increased effectiveness by providing increased customer intelligence, which leads to better customer insights and ultimately, to increased customer value by appropriate response to these customer insights.

The web portal has two components: ordering and customer support. The ordering component allows customer to directly place orders via the web for standard products. The customer support component offers different kind of information to the customer, such as answers to frequently asked questions (FAQs), pending quotations, current sales orders and invoices. Customers that place orders on the website instead of via e-mail or phone or retrieve information from the portal instead of via the sales support department, get served more quickly and save the effort of the sales support department. Although these functionalities do not directly address the causes described in section 3.2, both increase the efficiency of the customer support process. Therefore, the web portal considered relevant for the complete CRM solution.

To-be – System level: Data dimension
For the CRM system and the web portal, UML class diagrams were developed, reflecting the data stored in the systems. The CRM system contains all the relevant customer data that is included in the UML class diagram of the organization level (figure 24 in appendix C.2), in order to provide a 360° view of the customer (cause 1 in figure 17). The class diagrams are included in appendix D.3.

To-be – System level: Network dimension
The interfaces between the IT systems relevant for the to-be situation are reflected in the UML component diagram in figure 62 in appendix D.4. In order to address the problem of redundancy of customer-related data (cause 3.2 in figure 17), it was decided to make the CRM system the
leading system for the customer profile data, including the fleet list, status, contact data, etcetera. The fleet list, in turn, is imported from the CRM system by the other system requiring this information, such as HARP and the Claim Registration Program. In order to create a 360° view of the customer, but without creating redundancy, the data required to get a complete overview was retrieved from the existing systems in which it is already being registered. Claims, for example, are imported into the CRM system from the Claim Registration Program and the status of quotations and sales orders for new build parts and after sales are retrieved from HARP.

**To-be – System level: People dimension**

Table 8 provides an overview which representative should have access to the CRM system and the web portal. The basic premise is that as many representatives as possible should have access to customer related data, in order to create a consistent view of the customer throughout the entire organization (cause 1 in figure 17). Since the web portal is primarily aimed at customers, not all representatives need access to the portal. The criteria used are (1) the representative should not be external to the company; (2) fulfil a commercial role. In order to address the problem of limited access, every sales representative should have access to the CRM system. There are, however, confidentiality issues that cannot be ignored. Agents for example, should not be allowed to see all information available in the CRM system, since they are external to SMES. An analysis of which representative is not allowed to see which information has not been made, due to the limited time frame of the project.

<table>
<thead>
<tr>
<th>Role</th>
<th>System</th>
<th>web portal</th>
<th>CRM System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area Manager</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Agent</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Central Sales Office Employee</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>PL Manager</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Marketing Manager PL</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Local Sales Manager</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>(Key) Account Manager</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Technical Account Manager</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Sales Support Employee The Netherlands</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Sales Support Employee India</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Project Manager TS</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Project Leader Warranty</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Field Engineer Warranty</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Customer</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

*Table 8 – Roles with access to the web portal and the CRM system*

**3.3.3 Validation of the models of the to-be situation**

The validation procedure described in section 2.2.1 for the models of the to-be situation, lead to several changes in different models. In the component diagram, for example, which shows the interfaces between the systems relevant for the to-be situation, the interface between HARP and the web portal was changed. Also, in the process flow diagram of the ‘sales planning’ process, the information flow from the last process step was added. A third example is the change of ‘technical superintendent’ to ‘purchaser’ in the collaboration diagram of the organization level.
4. Results of the applied survey

In this chapter, the results of the applied survey are presented, starting with the scope of the applied research. In the second section, the results of the survey are presented. In the last section, the outcome of the validation procedure for the survey is discussed.

4.1 Scope of the applied survey

The scoping of the applied survey included three steps: (1) selecting the units of analysis, (2) selecting the included entities, and (3) selecting the candidate respondents. Each step is now separately discussed.

4.1.1 Selection of the units of analysis

Recall from section 2.1.2 that the appropriate unit of analysis is BU. Although the PLs are not actual BU, they were selected as entities to be included in the scope of the survey. The reason for including the PLs is that they are the central operational entities of the organization and therefore, considered as essential organizational elements for determining the level of MO and its antecedents. In order to have a representative set of entities, the most important BUs that fulfill an important role for the PLs, in terms of sales activities and supplies, were also included in the research, complementary to the PLs. Additionally, the board of Directors (BoD) of SMES was approached, in order to reveal possible differences in perception of the level of MO and its antecedents between the executive board and the PLs or BUs.

4.1.2 Selection of the included entities

The survey covered four out of six PLs serving the dredging market, three of the seven BUs from the Technology division that supply these PLs with products for new build activities and serving the external customers directly with after sales, and the BoD. The reason for this sample size was to limit the number of surveys to a manageable quantity. The four selected PLs are the most important PLs, since they account for the largest part of the revenue in the dredging market. The BUs from the Technology division were indicated as the most important ones by two PL Managers.

4.1.3 Selection of the candidate respondents

The candidate respondents selected as the key informants were the PL Managers (as the non-marketing executives) and Marketing Managers (as marketing executives). There are two Marketing Managers responsible for the marketing activities of these four PLs, both covering two PLs. This resulted in six candidate respondents for the PLs: four PL Managers and two Marketing Managers. For each selected BU, the Sales Manager or General Manager (as the Sales executives) and the Operations Manager (as the non-commercial executive) were approached. This resulted in six respondents for the BUs. The survey was sent to two members of the executive board of SMES, of which one is responsible for Sales, and the other is not. This resulted in a total of 14 candidate respondents which are shown in table 9.
As can be seen from table 9, twelve of the fourteen candidates responded. One of the cases was not useful due to sixteen missing values (out of a total of 63) which showed a non-random pattern. Therefore, this case was excluded from the analysis. Another case included one missing value. In order to include this case in the research, a remedy was applied to replace this missing value. This was done by replacing the missing value with the average of the scores of this case on the other items measuring the same construct. This led to a total of eleven useful cases. For an entity to be included in the analysis, useful cases of both respondents were required. Since this requirement was only met for one PL, only one of the four PLs could be included in the analysis.

### 4.2 Outcome of the applied survey

The main results of the survey are displayed in table 10. The average scores and standard deviations of the individual items measured are included in appendix B1.
The average score on MO of all the entities, including the BoD, is 109, which is substantially lower than the external benchmark score of 131. In fact, it is even lower than the average score of 113 measured by Jaworski and Kohli (1993), on which the external benchmark is based. Looking at the average score of MO of the entities operating the dredge market, that is, excluding the score of the BoD, the level of MO is even slightly lower. The relatively high score of MO could either mean that the entities in the dredge market are slightly less market oriented compared to the entities in the offshore market, or that the BoD is slightly more positive about MO than the rest of the organization. Comparing the individual scores of MO, it appears that the level of MO of SMES Components is strongly lower than the level of MO of the other entities. Apart from the BoD, SMES Control notes a relatively high score. Still, none of the individual scores succeeds the external benchmark score, which is an approximation of the average score of the top 25% of the BUs surveyed by Jaworski and Kohli.

The scores on the antecedents correspond with the scores on MO. Although the average score on top management emphasis is moderate, SMES Components scores substantially lower than the other entities. The opposite is true of interdepartmental conflict, of which high scores correspond with lower levels of MO. These scores are the explanation of the low level of MO of SMES Components compared to the other entities. The moderate scores of the other entities on interdepartmental conflict and the overall moderate score on top management risk aversion explain the below average level of MO. Another striking observation is the overall low score on reward system orientation, which indicates that SMES’s reward system does not support market-oriented behavior. The low level of centralization and relatively high level of interdepartmental connectedness throughout all the entities surveyed indicate that these organizational conditions that fit a market-oriented organization are present within SMES.

4.3 Validation of the survey results

As already explained in section 2.2.2, the congruence between the two key informants of each entity was assessed by calculating the average absolute differences in the ratings of the two informants for each construct. These values are an indication of the degree to which the respondents have similar views on the constructs measured in their BU. The analysis of the average absolute differences reveals that of the 14 constructs measured, 8 scores are below 1.0. The other six vary between 1.0 and 1.20. Since all constructs where measured on a five-point scale, this means that on average, the scores of the commercial and non-commercial representative deviated approximately 20%. Although a deviation of 20% seems high, this percentage is considered acceptable considering the 5-point scale and the expected difference in perception of the key informants. Therefore, the averages of the two ratings are considered to be a reliable score of the organizational characteristics measured for each entity.
5. Results of the revision of the relationship between CRM and MO

In this chapter, the results of the analysis and formulation of the relationship between the two concepts applied to the central problem of this research, which are CRM and MO. In the first section, the analysis and formulation of the proposed relationship is presented. The outcome of the validation procedure is discussed in the second section.

5.1 Analysis of the relationship between CRM and MO

In this research, MO is defined as the organization wide generation of market intelligence pertaining to current and future needs of the customers, dissemination of intelligence horizontally and vertically within the organization, and organization wide responsiveness to it (Jaworski and Kohli, 1993). This definition of MO is classified as a behavioral perspective on the concept (Homburg and Pflesser, 2000). In the same article as the authors present this definition, they argue that market information does not only comprise customer information, but also information on competitors and external factors such as technology and regulation. MO is considered valuable because market oriented firms are characterized by their superior understanding of the current and future needs and by their ability to offer solutions to those needs that are superior to rivals’ offerings (Slater and Narver, 2000). So, MO has three behavioral components with market information as the central theme (market intelligence generation, market intelligence dissemination and response to market intelligence), where market information consists of customer information, competitor information and information on external factors. By being market oriented, firms increase their ability to deliver superior customer value.

The adopted definition of CRM reflects that CRM is a holistic approach, ranging from strategy to IT, aiming at the creation of long-term relationship with customers. The four main aspects of CRM are (1) the customer aspect, (2) the strategic aspect, (3) the organization aspect and (4) the IT aspect. The customer aspect of CRM refers to the focus that a firm puts on customers when it adopts CRM. The CRM paradigm is built on the premise that it is more expensive to attract new customers than retaining existing customers. When adopting CRM, a firm should put the customer’s interest central to its activities. In order to have the customer’s interest central to its activities, the organization needs to have a clear idea of what the customer’s interests are, which requires information of the customer. Therefore, one could state that customer information is the central theme of CRM. The strategic aspect of CRM refers to the strategic goal to create long-term relationships with customers by delivering customer value better that its competitors. The organization aspect refers to the notion that CRM should be embedded in an organization’s structure, culture and processes. The IT aspect of CRM refers to the necessary support that IT systems provide to enable successful CRM.

Looking at these definitions, the holistic view on CRM has many aspects, and including behavior. In fact, the collection and dissemination of customer intelligence could be referred to as CRM activities. So CRM includes MO, but is broader in the sense that it is also a strategy and that it is supported by IT. MO, in turn, is broader that CRM, in the sense that it is not only about customer information, but also information on competitors and external factors. Therefore, it is suggested that CRM and MO are overlapping concepts, both aiming at the creation of superior customer value. The overlapping nature of the two concepts is visualized in the figure below.
As depicted in figure 22, the collection and dissemination of customer intelligence, and response to it, reflects a part of the organization aspect of CRM. Recall that the organization aspect reflects the embodiment of CRM in the organization’s structure, culture and processes. By collecting, disseminating and responding to customer intelligence, the organization gives meaning to the organization’s strategic objective to establish long-term relationship with customers. IT can support the collection and dissemination of customer intelligence, as well as the response to it. The suggested overlapping nature is in contrast with the claims of Javalgi et al. and Landroguez et al., who posited a causal relationship between MO and CRM.

5.2 Validation of the developed relationship between MO and CRM

In order to validate the proposed model in figure 22, the first step is to provide evidence for the overlapping section. That is, the collection, dissemination of or response to customer intelligence is matched to the organization aspect of CRM, which refers to the organization’s processes, structure and culture. Three items from the survey were matched with examples of the conceptual CRM solution.

The first item concerns an item used to measure intelligence generation, one of the components of MO. The description of the item is: ‘In this business unit, we do a lot of in-house market research’. This component of MO can be found in the conceptual CRM solution developed in this research. One of the functional components of the CRM system is market sizing. Although this is an IT component, it does refer to the organization level of CRM, since the component supports the sales representatives in determining the market size. It also refers to the customer aspect of market information, because the market sizing model uses parameters of a customer’s ships (from the fleet list) to determine the potential of the aftermarket of a specific customer. The sales representatives feed the market sizing component and retrieve information from it. This indicates that doing in-house market research refers to both MO and CRM.

The second item refers to the dissemination of customer intelligence, which description is: ‘Our business unit periodically circulates documents (e.g. reports, newsletters) that provide
information on our customers’. Part of the developed CRM solution is the dissemination of visit reports, service reports and sales plans, which all contain relevant customer information, to all relevant sales representatives by making them centrally available. Although the central availability is an IT aspect of the solution, actually uploading the report or plan is a human action and therefore considered as an organization aspect of CRM. This illustrates that periodically circulating information on customers is refers to MO and CRM.

The third item refers to the implementation of response to market intelligence. The item is described as: ‘The activities of the different department in this business unit are well coordinated’. Since the poor coordination of sales force activities was identified as one of the main causes of the ineffectiveness and inefficiency of the sales force, coordination of activities performed by different departments is part of the CRM solution. By making the scheduling of customer activities, including customer visits, visible to sales representatives in other departments, these activities can be better coordinated. Still, the sales representatives have to check the aforementioned schedule, act on the available information and include their own activities in the schedule. This illustrates that this part of the solution is enabled by IT, but still reflects on behavior which fits the organization aspect of CRM.

The three items from the survey refer to three different components of MO, namely the collection, dissemination and response to market intelligence. Also, as explained, all three related examples from the CRM solution relate to the organization aspect of CRM. The second and third item identified from the survey, specifically address the customer information part of market intelligence. The third example does not refer specifically to customer information, competitor information or information on external factors, but can be all three. Based on this, the overlap between MO and CRM as indicated in figure 22 is considered valid for the case of SMES.

The second step towards validation of the model concerns evidence for the non-overlapping sections of MO and CRM, starting with the IT component of CRM. As already illustrated by the three examples from the conceptual CRM solution given before, the IT components enable the in-house market research, circulation of customer information, and coordination of activities. However, the actual behaviour in terms of MO (collection, dissemination, response) needs to be displayed by the sales representatives and will not occur without human action. Therefore, it can be stated that the IT component enables MO, but not actually displays market-oriented behaviour, which confirms the position of the IT aspect of CRM separately from MO in figure 22.

The non-overlapping part of MO in figure 22 refers to the collection and dissemination of, and response to competitor information and information on external factors. Items from the survey that illustrate this aspect of MO are: ‘If a major competitor were to launch an intensive campaign targeted at our customers, we would implement a response immediately’; and ‘We are slow to detect fundamental shifts in our industry (e.g., competition, technology, regulation)’ (a reversed scaled item). These items refer respectively to response implementation and intelligence generation. Since this research only addressed customer information, it can be stated that based on the SMES case as described in this research, the collection and dissemination of, and response to competitor information and information on external factors falls outside the domain of CRM. This confirms the position of the non-overlapping part of MO in figure 22.

Since the strategic aspect of CRM was not addressed in this research, the validity of the position of this aspect in figure 22 could not be assessed.
6. Research findings

In this section, the main findings of the research are presented by providing answers to the research questions. The research questions will now sequentially be addressed.

RQ1: How will the implementation of CRM improve the efficiency and effectiveness of the sales force?

The causes of the inefficiency and ineffectiveness of the sales force where categorized in three main causes: (1) an incomplete view of the customer, (2) poor coordination of activities and (3) inefficient processes. As the description of the to-be situation revealed, these causes can be eliminated. Firstly, by making all relevant customer data centrally available to all sales representatives, a complete view of the customer is provided, eliminating the first cause. By having a 360º view of the customer, sales representatives are able to respond better to a customer’s needs, increasing the effectiveness of the sales force. Furthermore, by having all relevant customer data centrally available, including the planning of customer related activities such as visits and other interactions, these activities can be better coordinated, which addresses the second main cause. This concerted effort leads to an improved response to customer’s needs, which increases the effectiveness of the sales force. Also, limiting the number of contacts for smaller customers reduces the amount of required coordination and increases the response rate to customer requests, which improves the efficiency of the sales force. Lastly, the efficiency of multiple processes can be improved in two ways: (1) making all relevant customer data centrally available to all sales representatives reduces the effort required to collect the necessary data; and (2) different functionalities of the envisioned CRM system take over tasks that are currently performed manually by sales representatives. It is important to note that the web portal, which is currently being developed, is part of the total CRM solution and that this system also leads to improved efficiency of the sales force by automatically providing response to customer requests which are normally processed by sales representatives.

RQ2: What are the conceptual requirements for CRM in order to improve the efficiency of the sales force?

The conceptual requirements for CRM consist of system requirements for a CRM system and organizational requirements. The system requirements refer to the provision of a 360º view of the customer and the automation of manually performed tasks. More specifically, the CRM system requirements can be divided in the required functions of the system, required data to be stored in the system, the required interactions with other IT systems, and the required accessibility of the system. The required functions of the CRM system are account management, pipeline management, case management, task management, offering, scheduling, informing, market sizing and reporting. The required data to be stored in the CRM system can be categorized in sales pipeline data (including leads, quotations and sales orders), customer activity data (including dockings, service jobs, dredge projects and customer visits), customer request data (including claims, complaints, RFOs, RFQs), customer profile data (including ships, dockings, DMUs, business model, sales potential and organizational structure) and relevant documents (sales plans, visit reports, service reports and e-mails). The CRM system requires interfaces with Accountview SMES Components, Accountview SMES New Build, HARP, SMART, MS Outlook, Hyperion, ii-Desk, the Claim Registration Program, and the web portal. The access requirements are that every sales representative should have access to the system. Which person should have access to which data is not clear, since confidentiality
issues are not addressed in this research. The organizational requirements refer to the limitation of customer contacts required by the CRM system. This implicates that for each customer the right selection of customer contacts should be made, communicated to the customer and the organization, and implemented in the daily operations. Also, a vast amount of differences were indicated between the process flow diagrams of the as-is situation and the to-be situation. This implicates that sales representatives need to adapt their way of working in order to make the CRM solution successful. Firstly, they need to consult the CRM system in order to retrieve the relevant customer data. Secondly, they need to fill the CRM system frequently with new customer data.

RQ3: What is the level of market orientation at SMES?

The survey results indicated that the average level of MO of SMES is 109, with a possible minimum and maximum score of respectively 31 and 155. The external benchmark score of 131, which reflects the average score of the top 25% companies surveyed by the authors that developed the survey, is substantially higher. In fact, as already mentioned in section 4.2, the level of MO of SMES is even lower than the average score of 113 measured by the authors, on which the external benchmark is based. This leads to the observation that SMES’s level of MO is too low compared to their ambition to be a market-oriented organization.

RQ4: Which antecedents of MO need to be improved at SMES to increase the level of MO?

The antecedent with the lowest score for SMES is reward system orientation. In fact, all entities surveyed score low on this antecedent with the exception of SMES Control. Also, the scores on top management risk aversion show room for improvement. This applies especially to the PL Custom Build Cutters, who scored 20 out of a maximum of 25 (note that high levels of top management are associated with lower levels of MO). The scores of all entities on top management emphasis and interdepartmental conflict should also be improved. That means, top management emphasis should be increased and interdepartmental conflict should be decreased. This applies especially to SMES Components, which scores lower than all other entities on these antecedents. The antecedents mentioned should particularly improved at SMES Components, whose level of MO of 77 is significantly lower than the average level of MO at SMES.

RQ5: What is the relationship between market orientation and CRM, based on the SMES case?

Based on the evidence retrieved from the SMES case, the concepts of MO and CRM have similarities and differences. The concepts are similar in respect to the generation and dissemination of customer intelligence and the response to it. Since the suggested CRM solution is only concerned with customer information, MO differs from CRM as it is also concerned with the generation of, the dissemination of and response to information on competitors and external factors. In the case of SMES, the CRM solution mainly comprises the envisioned CRM system, which enables market-oriented behaviour. The IT component, itself, however does not display behaviour. Therefore, CRM is different from MO in the sense that CRM has an IT component and MO has not.
7. Conclusions

The last chapter describes the final conclusion of this research, including the limitations that are applicable to this research and recommendations for the company and future research. Based on the recommendations, SMES can take action in order to improve the efficiency and effectiveness of their sales force. The limitations can be used in order to expand the analysis in the company and direct future research to test the validity of the results.

7.1 Outcome of the research

The result of analysis of the CRM solution, using the EA framework of Zachman, show that performance of the sales force can be improved with the suggested solution by providing all sales representatives a 360º view of the customer, automating manually performed tasks, and limiting the number of contact persons for smaller customers. This solution is mainly IT based and partially requires the commitment of the sales representatives to fill the system with the required data.

The results of the survey show that the level of MO at SMES is too low in comparison with the organization’s ambition to be a market-oriented organization. Furthermore, these results provide clear insights in the organizational conditions that need to be improved in order to increase the level of MO. By shaping the right organizational conditions, more market-oriented behavior will be displayed which implicitly means that the organization will collect and disseminate more customer-related information and that the organization responds better to this information. This, in turn, leads to an increased efficiency and effectiveness of the sales force.

The results of the application of the EA framework and the survey were used to provide evidence for the reformulated relationship between CRM and MO. By comparing the outcomes of the application of both methods, it becomes clear that the results of the application of the EA framework and the conducted survey complement each other. The application of the EA framework resulted in (1) the identification of the causes of the inefficiency and the ineffectiveness of the sales force and (2) the design of a conceptual CRM solution eliminate these causes. One of the observations is that the designed CRM solution requires that employees need to deliver extra effort, which is not in their own interest, but is in the interest of the customer and thus benefits the organization as a whole. Based on the definition of MO, this required behaviour is labelled as MO. The survey tested the presence of the appropriate organizational conditions to display market-oriented behaviour and the results show that most of these organizational conditions are not present. Based on this observation, it can be concluded that the organization is not ready for the suggested CRM solution. So, the application of the EA framework led to a CRM solution to improve the performance of the sales force and that the conducted survey led to insight in the presence of the appropriate organizational conditions for a successful implementation of the suggested solution. This observation leads to the final conclusion that both applied methods complement each other and that the combination of the two methods leads to better insights than the application of one of these methods alone.

7.2 Limitations of the research

There are multiple limitations of this research, which can be categorized in three types. The first type concerns limitations related to the applied method. Due to the limited amount of time available to conduct this research, the EA framework used to design the conceptual CRM solution is covers only a part of the original Zachman framework. The time dimension and motivation dimension were not addressed, which leads to a less extensive description of the EA.
Also, the description of the to-be situation is based on the outcome of a single brainstorm session with only two sales representatives. The incorporation of the interests of the departments and roles that did not participate is therefore not ensured, which means that there might not be companywide support for the designed solution. Despite this limitation, the resulted solution gives a good indication of the possibilities to improve the performance of the sales force by means of CRM implementation.

The second type of limitations refers to the scope of the research. Firstly, the strategic aspect of CRM was not explicitly addressed in this research, which means that there is no grounded basis to address the misalignment of the sales force. Although the company sets itself the goal to become a market-oriented organization and recognizes that the alignment of sales force needs to be improved, there is no strategic analysis that confirms this. Since the misalignment of the sales force and the necessity to address the inefficiency and ineffectiveness of the sales force resulting from this misalignment are recognised by the company the consequences of this limitation for the solution are considered small. Secondly, the description of the EA of both the as-is and to-be situation includes a limited number of BUs. This implicates that the applicability of the solution to other entities in not guaranteed. In fact, it is likely that the inclusion of these BUs into the analysis would have led to a different set of requirements for the CRM solution, since they are, for example, using different IT systems to support their processes. The same limitation applies for the exclusion of several departments and roles of the entities addressed in this research and the exclusion of several processes executed by these entities. Also, the analysis of improvements focussed on the current activities performed by the sales force and did not include exploration of possible new activities to increase the effectiveness of the sales force. This exploration could have led to a better solution to solve the central problem of this research. Still, the resulted solution gives a good indication of the possibilities to improve the performance of the sales force by means of CRM implementation. The scope of the applied survey is also limited in terms of the relatively small amount of entities analysed. Firstly, only one PL was included in the analysis, due to the limited amount PLs approached and the necessary exclusion of one of the cases. Secondly, only three of the seven BUs from the Technology division serving the PLs were included. Due to this limited sample size, the average level of MO at SMES might be slightly biased. Despite this possible bias the large difference between the measured level of MO and the external benchmark indicates that the conclusions drawn with respect to the average level of MO are correct. Next, the existence of correlations between the constructs measured could not be confirmed for SMES. However, this existence of these correlations has been proved multiple times in different circumstances. Furthermore, there is no reason to question the existence of correlations, because the low scores on MO correspond with the scores on the antecedents of MO.

The third type of limitations refers to the validation of the created artefacts and the results. Firstly, not all models describing the as-is situation were validated. This means that the identification of the causes of the limited performance of the sales force was possibly partly based on false models. The same applies for the limited validation of the structure of the causes. This implicates that the solution described in the models of the to-be situation might not address the actual problems causing the inefficiency and ineffectiveness of the sales force. Since the validation procedures executed for the models and the structure of causes only led to minor changes in the models and the structure of the causes, the correctness is considered likely. Secondly, validation the proposed relationship between MO and CRM is limited. The position of the strategic aspect of CRM in the relationship was not validated, because this aspect was not addressed by the method applied to design the CRM solution. Furthermore, the aspects of the relationship that were validated are based on a single case, which limits the
generalization of the proposed relationship. Therefore, future research should focus on the examination of the validity of the proposed relationship.

### 7.3 Company recommendations

From the results of the method applied to develop a conceptual CRM solution it becomes clear that the efficiency and effectiveness of the sales force can be improved by means of CRM implementation. The results of the survey, however, indicate the organization is not ready to make the implementation of the suggested solution successful. The reason is that this solution requires that employees deliver extra effort to fill and use the system, which is not in their own interest. This lack of market-oriented behaviour can be addressed by improving the organizational conditions that stimulate this behaviour. Therefore, it is recommended to SMES to first improve the antecedents of MO, before implementing the suggested CRM solution. Specifically, the antecedents depicted in table 11 should be improved:

<table>
<thead>
<tr>
<th>Antecedent</th>
<th>Relevant department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reward system orientation</td>
<td>Entire organization</td>
</tr>
<tr>
<td>Top management emphasis</td>
<td>SMES Components and PL Custom Build Cutters</td>
</tr>
<tr>
<td>Top management risk aversion</td>
<td>SMES Components, SMES Control and PL Custom Build Cutters</td>
</tr>
<tr>
<td>Interdepartmental conflict</td>
<td>SMES Components</td>
</tr>
</tbody>
</table>

**Table 11 – Antecedents recommended for improvement**

Reward systems are instrumental in shaping the behaviour of employees. The greater the extent to which the reward system relies on market-based factors such as customer satisfaction and market-oriented behaviour, the greater the level of MO (Jaworski and Kohli, 1993). Top management emphasis refers to the signals from top managers about the importance of being responsive to customer needs. The reinforcement by top management of the importance of a market orientation is likely to encourage individuals in the organization to track changing markets, share market intelligence with others in the organization, and be responsive to market needs (Jaworski and Kohli, 1993). Responsiveness to changing market needs often requires introduction of new products and services to match the changing needs and expectations of customers. The introduction of new products, however, bears the risk of failure. Kohli and Jaworski (1990) state that if top management is willing to take risks and accept that some initiatives will fail, their subordinates are more likely to put forward new initiatives in response to customer needs. On the other hand, if top managers avoid risks and are intolerant of failures, subordinates are less likely to bring up new ideas, hampering the organization to respond adequately to evolving market needs (Jaworski and Kohli, 1993). According to Jaworski and Kohli (1993), interdepartmental conflict refers to the tension among departments, which is likely to inhibit communication across departments and concerted efforts by the departments. The authors state that this hampers the dissemination of market intelligence and the joint effort to respond to the changing needs.

Although the suggested CRM solution gives good indication of how the performance of the sales force can be improved, it is recommended to perform additional analyses to address more BUs, departments, roles and processes to make sure that the CRM solution also fit their interest. In addition, a thorough validation of the causes is recommended, to ensure that the right problems are addressed by the CRM solution. Also, extensive research is recommended to improve the suggested solution prior to development and implementation. This should be done by involving all stakeholders in the design phase, to make sure that the best possible fit between the solution and the stakeholders’ interests.
In order to improve the reward system orientation, SMES should adjust its reward system by incorporating market-based factors for the evaluation of employees and administering rewards. Top management emphasis, top management risk aversion, and interdepartmental conflict are less tangible characteristics and therefore not easily changed. In their paper on creating a market orientation, Narver, Slater and Tietje (1998) state leadership is vital to achieving organizational change, which is demonstrated by (1) deliberate role modelling, teaching and coaching; (2) what leaders pay attention to; and (3) leader’s reactions to critical incidents. Furthermore, the authors stress that only in organizations whose core value is the continuous creation of superior customer value for customers will there be requisite leadership. In order to achieve this, the following steps are recommended for SMES, which are adopted from the leadership guideline for creating a market orientation introduced by Slater, Narver & Tietje (1998):

9. Establish a sense of urgency in the organization for creating a market orientation
10. Form a powerful guiding coalition for creating market orientation
11. Create a vision of market orientation
12. Communicate this vision
13. Empower others to act on the vision
14. Plan for and create short-term wins
15. Consolidate improvements based on the market performance and produce still more change
16. Institutionalize continuous learning and improvement in attracting, retaining and growing targeted customers

These are, however, guidelines and not a concrete plan to establish and maintain an increased level of MO. The set up of such a plan for SMES goes beyond the scope of this project. This is, therefore, a recommendation for further analysis in succession of this research. Part of this future research should also include the analysis of scores on the antecedents by entities not addressed in this project, in order to make sure that the appropriate organizational conditions are present throughout the entire organization.

In addition, although the suggested CRM solution gives good indication of how the performance of the sales force can be improved, it is recommended to perform additive analyses to address more BUs, departments, roles and processes to make sure that the CRM solution also fit their interest. Also, a thorough validation of the causes is recommended, to ensure that the right problems are addressed by the CRM solution. Furthermore, extensive research is recommended to improve the suggested solution prior to development and implementation. This should be done by involving all stakeholders in the design phase, to make sure that the best possible fit between the solution and the stakeholders’ interests.

7.4 Future research

Firstly, due to the limited validation of the proposed relationship between CRM and MO, future research is required. Especially, the strategic aspect of CRM in relation to MO needs to be investigated, because this part of the relationship was not addressed in this research. Secondly, this research showed that the simultaneous application of the Zachman framework to develop a CRM solution and the MO survey leads to complementary insights. However, this conclusion is based on the single case of SMES. Therefore, additional qualitative and quantitative research is required to validate this conclusion.
REFERENCES


Slater, S. F., Narver, J.C., 2000. Intelligence Generation and Superior Customer Value. Journal of the Academy of Marketing Science; 28 (1); p.120-127.


Appendix A: List of figures, tables and abbreviations

A.1 List of figures

Figure 1 – Divisions of SMES .......................... 1
Figure 2 – Organizational structure of SMES .......... 1
Figure 3 – Ishikawa diagram – Preliminary identified causes of the inefficiency and ineffectiveness of the sales force .......... 2
Figure 4 – Cause and effect diagram – Consequences of the inefficient and ineffective sales force .......... 3
Figure 5 – Relationship between applied concepts, methods and results .......... 10
Figure 6 – The Zachman framework 3.0 (source: http://www.zachman.com) .......... 11
Figure 7 – The applied framework ................. 12
Figure 8 – Scope: High level process model of selected processes .......... 21
Figure 9 – Organizational functions of SMES New Build .......... 22
Figure 10 – Scope: UML collaboration diagram of the selected entities .......... 23
Figure 11 – Organization chart of the Area Management .......... 24
Figure 12 – As-is: Process flow diagram of the ‘Sales planning’ process .......... 25
Figure 13 – As-is: UML collaboration diagram of the organization level .......... 26
Figure 14 – As-is: UML Component diagram of HARP .......... 27
Figure 15 – As-is: UML data class diagram of HARP .......... 28
Figure 16 – As-is: UML component diagram of interfaces between HARP and Accountview SMES Components .......... 29
Figure 17 – causes of the inefficiency and ineffectiveness of the sales force .......... 33
Figure 18 – To-be: Process flow diagram of the ‘Sales planning’ process .......... 34
Figure 19 – To-be: UML Collaboration diagram of the organization level .......... 35
Figure 20 – UML component diagram: functions of the CRM system .......... 35
Figure 21 – UML component diagram: functions of the web portal .......... 36
Figure 22 – Proposed relationship between MO and CRM .......... 43
Figure 23 – As-is: Relationship between process models and system models .......... 60
Figure 24 – As-is: UML class diagram of the organization level .......... 61
Figure 25 – Organization chart of the PLs .......... 62
Figure 26 – Organization chart of SMES Components .......... 62
Figure 27 – Organization chart of the Warranty department .......... 63
Figure 28 – Legend for the process flow diagrams .......... 66
Figure 29 – As-is: Process flow diagram ‘Visiting customer’ .......... 67
Figure 30 – As-is: Process flow diagram of the ‘Preparing visit to customer’ process .......... 68
Figure 31 – As-is: Process flow diagram of the ‘Lead Management – New build vessels’ process .......... 69
Figure 32 – As-is: Process flow diagram of the ‘Lead Management – New build parts & after sales’ process .......... 70
Figure 33 – As-is: Process flow diagram of the ‘Offering – New build vessels’ process .......... 71
Figure 34 – As-is: Process flow diagram of the ‘Offering – New build parts & after sales’ process .......... 72
Figure 35 – As-is: Process flow diagram of the ‘Claim settlement – New build vessels’ process (page 1)  
Figure 36 – As-is: Process flow diagram of the ‘Claim settlement – New build vessels’ process (page 2)  
Figure 37 – As-is: Process flow diagram of the ‘Complaint and Claim Management – New build parts & after sales’ process  
Figure 38 – As-is: Process flow diagram of the ‘Customer support – New build parts & after sales’ process  
Figure 39 – As-is: UML component diagram of Accountview  
Figure 40 – As-is: UML component diagram of Claim Registration Program  
Figure 41 – As-is: UML component diagram of Hyperion  
Figure 42 – As-is: UML component diagram of MS Outlook  
Figure 43 – As-is: UML class diagram of Accountview  
Figure 44 – As-is: UML class diagram of the Claim Registration Program  
Figure 45 – As-is: UML class diagram of MS Outlook  
Figure 46 – As-is: UML class diagram of Intranet  
Figure 47 – As-is: UML class diagram of ii-Desk  
Figure 48 – As-is: UML class diagram of the SMES Components Complaint database  
Figure 49 – As-is: UML class diagram of SMART  
Figure 50 – As-is: UML component diagram of interfaces between SMART and Accountview SMES New Build  
Figure 51 – As-is: UML component diagram of the interfaces of Hyperion  
Figure 52 – To-be: Relationship between the process models and system models  
Figure 53 – To-be: Process flow diagram of the ‘Visiting customer’ process  
Figure 54 – To-be: Process flow diagram of the ‘Lead management’ process  
Figure 55 – To-be: Process flow diagram of the ‘Offering – new build vessels’ process  
Figure 56 – To-be: Process flow diagram ‘Offering – new build parts & after sales’ (page 1)  
Figure 57 – To-be: Process flow diagram ‘Offering – new build parts & after sales’ (page 1)  
Figure 58 – To-be: Process flow diagram of the ‘Claim settlement – new build vessels’ process (page 1)  
Figure 59 – To-be: Process flow diagram of the ‘Claim settlement – new build vessels’ process (page 2)  
Figure 60 – To-be: Process flow diagram of the ‘Complaint & claim management – new build parts & after sales’ process  
Figure 61 – To-be: Process flow diagram of the ‘Customer support – new build parts & after sales’ process (page 1)  
Figure 62 – To-be: Process flow diagram of the ‘Customer support – new build parts & after sales’ process (page 2)  
Figure 63 – To-be: UML class diagram of the web portal  
Figure 64 – To-be: UML class diagram of the CRM system  
Figure 65 – To-be: UML component diagram of the Interfaces of the CRM system
A.2 List of tables

Table 1 – constructs measured by the survey 17
Table 2 – Scope: Selected data types 20
Table 3 – Scope: Selected activities 20
Table 4 – Scope: Selected entities 22
Table 5 – Relevant IT systems for the as-is situation 27
Table 6 – Roles with access to HARP 29
Table 7 – Relevant IT systems for the to-be situation 35
Table 8 – Roles with access to the web portal and the CRM system 38
Table 9 – Candidate respondents for the applied survey 40
Table 10 – Results of the applied survey 40
Table 11 – Antecedents recommended for improvement 49
Table 12– calculated probabilities required to determine the external benchmark 59
Table 13 – As-is: Component access 82
Table 14 – Validated as-is models 83

A.3 List of abbreviations

BU Business Unit
CRM Customer Relationship Management
CRUD Create, Read, Update and Delete
DMU Decision Making Unit
FAQ Frequently Asked Question
(K)AM (Key) Account Manager
MO Market Orientation
OLAP Online Analytical Processing
PL Product Line
RFQ Request for quotation
RFO Request for order
LSO Local SMES Office
LSM Local Sales Manager
SSE Sales Support Employee
TAM Technical Account Manager
TS Technical Service
UML Unified Modeling Language
Appendix B: Applied Survey and development of external benchmark

B.1 Applied survey

**MARKET ORIENTATION**

<table>
<thead>
<tr>
<th>Market Orientation – Intelligence generation</th>
<th>μ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 In this business unit, we meet with customers at least once a year to find out what products or services they will need in the future.</td>
<td>4.2</td>
<td>1.08</td>
</tr>
<tr>
<td>2 Individuals from our manufacturing department interact directly with customers to learn how to serve them better.</td>
<td>2.8</td>
<td>0.98</td>
</tr>
<tr>
<td>3 In this business unit, we do a lot of in-house market research.</td>
<td>3.7</td>
<td>1.00</td>
</tr>
<tr>
<td>4 We are slow to detect changes in our customers' product preferences.</td>
<td>3.8</td>
<td>1.25</td>
</tr>
<tr>
<td>5 We poll end users at least once a year to assess the quality of our products and services.</td>
<td>3.1</td>
<td>1.51</td>
</tr>
<tr>
<td>6 We often talk with or survey those who can influence our end users' purchases (e.g., retailers, distributors)</td>
<td>3.3</td>
<td>1.27</td>
</tr>
<tr>
<td>7 We collect industry information through informal means (e.g., lunch with industry friends, talks with trade partners)</td>
<td>4.1</td>
<td>1.14</td>
</tr>
<tr>
<td>8 In our business unit, intelligence on our competitors is generated independently by several departments.</td>
<td>3.5</td>
<td>0.92</td>
</tr>
<tr>
<td>9 We are slow to detect fundamental shifts in our industry (e.g., competition, technology, regulation).</td>
<td>4.0</td>
<td>0.89</td>
</tr>
<tr>
<td>10 We periodically review the likely effect of changes in our business environment (e.g., regulation) on customers.</td>
<td>3.2</td>
<td>0.75</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Market Orientation – Dissemination</th>
<th>μ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 We have interdepartmental meetings at least once a quarter to discuss market trends and developments.</td>
<td>4.2</td>
<td>1.17</td>
</tr>
<tr>
<td>2 Marketing personnel in our business unit spend time discussing customers' future needs with other functional departments.</td>
<td>3.8</td>
<td>0.87</td>
</tr>
<tr>
<td>3 Our business unit periodically circulates documents (e.g., reports, newsletters) that provide information on our customers.</td>
<td>3.7</td>
<td>1.19</td>
</tr>
<tr>
<td>4 When something important happens to a major customer or market, the whole business unit knows about it in a short period.</td>
<td>4.3</td>
<td>1.00</td>
</tr>
<tr>
<td>5 Data on customer satisfaction are disseminated at all levels in this business unit on a regular basis.</td>
<td>3.2</td>
<td>1.47</td>
</tr>
<tr>
<td>6 There is minimal communication between marketing and manufacturing departments concerning market developments.</td>
<td>2.8</td>
<td>1.33</td>
</tr>
<tr>
<td>7 When one department finds out something important about competitors, it is slow to alert other departments.</td>
<td>3.4</td>
<td>1.50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Market Orientation – Response design</th>
<th>μ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 It takes us forever to decide how to respond to our competitors' price changes.</td>
<td>3.5</td>
<td>1.36</td>
</tr>
<tr>
<td>2 Principles of market segmentation drive new product development efforts in this business unit.</td>
<td>3.5</td>
<td>1.12</td>
</tr>
<tr>
<td>3 For one reason or another we tend to ignore changes in our customers' product or service needs.</td>
<td>3.8</td>
<td>0.87</td>
</tr>
<tr>
<td>4 We periodically review our product development efforts to ensure that they are in line with what customers want.</td>
<td>3.3</td>
<td>0.90</td>
</tr>
<tr>
<td>5 Our business plans are driven more by technological advances than by market research.</td>
<td>2.5</td>
<td>1.28</td>
</tr>
<tr>
<td>6 Several departments get together periodically to plan a response to changes taking place in our business environment.</td>
<td>3.3</td>
<td>1.00</td>
</tr>
<tr>
<td>7 The product lines we sell depend more on internal politics than real market needs.</td>
<td>3.4</td>
<td>1.36</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Market Orientation – Response implementation</th>
<th>μ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 If a major competitor were to launch an intensive campaign targeted at our customers, we would implement a response immediately.</td>
<td>2.9</td>
<td>1.45</td>
</tr>
<tr>
<td>2 The activities of the different departments in this business unit are well coordinated.</td>
<td>3.3</td>
<td>0.90</td>
</tr>
<tr>
<td>3 Customer complaints fall on deaf ears in this business unit.</td>
<td>4.3</td>
<td>0.64</td>
</tr>
<tr>
<td>4 Even if we came up with a great marketing plan, we probably would not be able to implement it in a timely fashion.</td>
<td>3.2</td>
<td>0.87</td>
</tr>
<tr>
<td>5 We are quick to respond to significant changes in our competitors' pricing structures.</td>
<td>3.3</td>
<td>1.00</td>
</tr>
</tbody>
</table>
6 When we find out that customers are unhappy with the quality of our service, we take corrective action immediately.
7 When we find that customers would like us to modify a product or service, the departments involved make concerted efforts to do so.

ANTECEDENTS OF MARKET ORIENTATION

Antecedents – Top management emphasis

<table>
<thead>
<tr>
<th>#</th>
<th>Antecedent</th>
<th>μ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Top managers repeatedly tell employees that this business unit’s survival depends on its adapting to market trends.</td>
<td>3,5</td>
<td>1,02</td>
</tr>
<tr>
<td>2</td>
<td>Top managers often tell employees to be sensitive to the activities of our competitors.</td>
<td>3,3</td>
<td>1,10</td>
</tr>
<tr>
<td>3</td>
<td>Top managers keep telling people around here that they must gear up now to meet customers’ future needs.</td>
<td>3,7</td>
<td>0,78</td>
</tr>
<tr>
<td>4</td>
<td>According to top managers here, serving customers is the most important thing our business unit does.</td>
<td>3,9</td>
<td>0,94</td>
</tr>
</tbody>
</table>

Antecedents – Top management risk aversion

<table>
<thead>
<tr>
<th>#</th>
<th>Antecedent</th>
<th>μ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Top managers in this business unit believe that higher financial risks are worth taking for higher rewards.</td>
<td>3,1</td>
<td>1,04</td>
</tr>
<tr>
<td>2</td>
<td>Top managers in this business unit like to take big financial risks.</td>
<td>3,5</td>
<td>1,20</td>
</tr>
<tr>
<td>3</td>
<td>Top managers here encourage the development of innovative marketing strategies, knowing well that some will fail.</td>
<td>2,9</td>
<td>1,22</td>
</tr>
<tr>
<td>4</td>
<td>Top managers in this business unit like to “play it save”.</td>
<td>2,8</td>
<td>0,98</td>
</tr>
<tr>
<td>5</td>
<td>Top managers around here like to implement plans only if they are very certain that they will work.</td>
<td>2,5</td>
<td>0,92</td>
</tr>
</tbody>
</table>

Antecedents – Interdepartmental conflict

<table>
<thead>
<tr>
<th>#</th>
<th>Antecedent</th>
<th>μ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Most departments in this business unit get along well with each other.</td>
<td>2</td>
<td>0,89</td>
</tr>
<tr>
<td>2</td>
<td>When members of several departments get together, tensions frequently run high.</td>
<td>2,2</td>
<td>0,75</td>
</tr>
<tr>
<td>3</td>
<td>People in one department generally dislike interacting with those from other departments.</td>
<td>2,1</td>
<td>0,54</td>
</tr>
<tr>
<td>4</td>
<td>Employees from different departments feel that the goals of their respective departments are in harmony with each other.</td>
<td>2,4</td>
<td>0,80</td>
</tr>
<tr>
<td>5</td>
<td>Protecting one’s departmental turf is considered to be a way of life in this business unit.</td>
<td>2,3</td>
<td>0,78</td>
</tr>
<tr>
<td>6</td>
<td>The objectives pursued by the marketing department are incompatible with those of the manufacturing department.</td>
<td>2,2</td>
<td>0,75</td>
</tr>
<tr>
<td>7</td>
<td>There is little or no interdepartmental conflict in this business unit.</td>
<td>3,3</td>
<td>1,00</td>
</tr>
</tbody>
</table>

Antecedents – Interdepartmental connectedness

<table>
<thead>
<tr>
<th>#</th>
<th>Antecedent</th>
<th>μ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>In this business unit, it is easy to talk with virtually anyone you need to, regardless of rank or position.</td>
<td>4,4</td>
<td>0,66</td>
</tr>
<tr>
<td>2</td>
<td>There is ample opportunity for informal “hall talk” among individuals from different departments in this business unit.</td>
<td>2,6</td>
<td>1,20</td>
</tr>
<tr>
<td>3</td>
<td>In this business unit, employees from different departments feel comfortable calling each other when the need arises.</td>
<td>4,0</td>
<td>0,63</td>
</tr>
<tr>
<td>4</td>
<td>Managers here discourage employees from discussing work-related matters with those who are not their immediate superiors or subordinates.</td>
<td>4,0</td>
<td>0,89</td>
</tr>
<tr>
<td>5</td>
<td>People around here are quite accessible to those in other departments.</td>
<td>4,3</td>
<td>0,64</td>
</tr>
<tr>
<td>6</td>
<td>Junior managers in my department can easily schedule meetings with junior managers in other departments.</td>
<td>4,5</td>
<td>0,50</td>
</tr>
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</table>

Antecedents – Centralization

<table>
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<tr>
<th>#</th>
<th>Antecedent</th>
<th>μ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>There can be little action taken here until a supervisor approves a decision.</td>
<td>2,0</td>
<td>0,89</td>
</tr>
<tr>
<td>2</td>
<td>A person who wants to make his own decision would be quickly discouraged here.</td>
<td>2,0</td>
<td>1,10</td>
</tr>
<tr>
<td>3</td>
<td>Even small matters have to be referred to someone higher up for a final answer.</td>
<td>1,5</td>
<td>0,67</td>
</tr>
<tr>
<td>4</td>
<td>I have to ask my boss before I do almost everything.</td>
<td>1,3</td>
<td>0,64</td>
</tr>
<tr>
<td>5</td>
<td>Any decision I make has to have my boss’ approval.</td>
<td>1,5</td>
<td>0,92</td>
</tr>
</tbody>
</table>

Antecedents – Reward system orientation

<table>
<thead>
<tr>
<th>#</th>
<th>Antecedent</th>
<th>μ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No matter which department they are in, people in this business unit get recognized for being sensitive to</td>
<td>3,3</td>
<td>1,00</td>
</tr>
</tbody>
</table>
competitive moves.

2 Customer satisfaction assessments influence senior managers' pay in this business unit. 2,8 1,25
3 Formal rewards (i.e., pay raise, promotion) are forthcoming to anyone who consistently provides good market intelligence. 2,9 0,94
4 Salespeople's performance in this business unit is measured by the strength of relationships they build with customers. 3,6 0,80
5 We use customer polls for evaluating our salespeople. 1,5 0,50

B.2 Development of external benchmark
The data reported in the survey of Jaworski and Kohli are:

\[ \mu = 113,95 \quad \sigma = 15,8 \]

The scores on MO are assumed to be normally distributed.

For the top 25%, the cut off score \( X_c \) is determined by solving the equation:

\[ P(MO \leq X_c) = 0,75 \]

Under the assumption of a normal distribution, \( X_c \approx 125 \) (z-score = 0,68 for P= 0,7517)

For each possible value of MO between 124 and 155, the required probabilities are calculated based on the assumed normal distribution, which are displayed in table Y.

<p>| X   | P(MO≤X) | P(X-1&lt;MO≤X| MO&gt;124) | P(X-1 &lt;MO ≤X| MO &gt;124) * (X-0,5) |
|-----|---------|-----------------|-------------------------------|
| 124 | 0,73763654 | -               | -                            |
| 125 | 0,757838675 | 0,077000567 | 9,586570586                   |
| 126 | 0,77166376 | 0,073667654 | 9,245290605                   |
| 127 | 0,795583593 | 0,07019734 | 8,879963529                   |
| 128 | 0,813063081 | 0,066623182 | 8,494454674                   |
| 129 | 0,829586288 | 0,06297307 | 8,09712424                    |
| 130 | 0,845143108 | 0,05929492 | 7,678692155                   |
| 131 | 0,859731528 | 0,055603854 | 7,256302939                   |
| 132 | 0,873357156 | 0,05193417 | 6,82934381                    |
| 133 | 0,886032675 | 0,048312821 | 6,40144879                    |
| 134 | 0,897777211 | 0,044764372 | 5,97604649                    |
| 135 | 0,908615652 | 0,041310789 | 5,55630113                    |
| 136 | 0,918577932 | 0,037971293 | 5,14510167                    |
| 137 | 0,927698282 | 0,034762274 | 4,74505343                    |
| 138 | 0,936014488 | 0,03169727 | 4,358374637                   |
| 139 | 0,943567145 | 0,028787002 | 3,98699843                    |
| 140 | 0,950398947 | 0,026039457 | 3,63250428                    |
| 141 | 0,956553998 | 0,023460016 | 3,29613266                    |
| 142 | 0,962077175 | 0,021051623 | 2,978804684                   |
| 143 | 0,967013538 | 0,01881498 | 2,681134623                   |
| 144 | 0,971407803 | 0,016748766 | 2,403447991                   |
| 145 | 0,975308667 | 0,014849875 | 2,14580926                    |
| 146 | 0,97874441 | 0,013113652 | 1,908036394                   |
| 147 | 0,981770549 | 0,011534145 | 1,689752307                   |
| 148 | 0,984211559 | 0,010104343 | 1,490390601                   |
| 149 | 0,986734662 | 0,008816407 | 1,309236466                   |
| 150 | 0,988744863 | 0,007661893 | 1,145453031                   |</p>
<table>
<thead>
<tr>
<th>151</th>
<th>0,990484845</th>
<th>0,006631953</th>
<th>0,998108935</th>
</tr>
</thead>
<tbody>
<tr>
<td>152</td>
<td>0,991984913</td>
<td>0,00571752</td>
<td>0,866204277</td>
</tr>
<tr>
<td>153</td>
<td>0,99327298</td>
<td>0,004909473</td>
<td>0,748694563</td>
</tr>
<tr>
<td>154</td>
<td>0,994374586</td>
<td>0,004198778</td>
<td>0,644512369</td>
</tr>
<tr>
<td>155</td>
<td>0,995312958</td>
<td>0,003576612</td>
<td>0,552586536</td>
</tr>
</tbody>
</table>

Table 12—calculated probabilities required to determine the external benchmark

Column 1: X represents the possible values of MO higher than 124.
Column 2: P(MO ≤ X) reflects the possibility that MO is lower than or equal to X.
Column 3: P(X-1 < MO ≤ X | MO > 124) reflects the possibility that MO falls between X and the previous value of X, given that MO is larger than 124. Due to the assumption of a normal distribution, the probability of an interval is required.
Column 4: In column 4, the outcome of column 3 is multiplied with the average score of the interval for which the probability in column 3 is calculated. This is required to calculate the average score of the top 25%.

The average score of the top 25% is then calculated by taking the sum of the values column 4, reflected in the following equation:

\[ E(MO | MO > 124) = \sum_{X=125}^{X=155} \left[ \frac{(P(MO \leq X) - P(MO \leq X-1))}{P(MO > 124)} \right] \times (X - 0.5) = 131 \]
Appendix C: Models of the as-is situation

C.1 As-is: Relationship between the process models and system models

![Diagram showing the relationship between process models and system models for the as-is situation.]

**Figure 23 – As-is: Relationship between process models and system models**
C.2 As-is – Organization level: Data dimension

Figure 24 – As-is: UML class diagram of the organization level
C.3 As-is – Organization level: People dimension

C.3.1 Organization chart of the PLs

Figure 25 shows the organization chart of a PL, which is applicable to all PLs.

The only roles within the PL that are involved in the selected processes are the roles of PL Manager and the Marketing Manager. In the sales planning process, the PL Manager and the Marketing Manager support the Area Manager in the set up of the annual sales plan. Also, the PL Manager acts as a secondary salesman for new build vessels, who determines the contractual terms and the price. He comes in the picture when the functionality and technical design need to be discussed.

C.3.2 Organization chart of SMES Components

Figure 26 shows the organization chart of SMES Components.

The departments included in this research are External Sales, Sales Support, and TS. The latter is responsible for the execution of service jobs and a sub department of the department Operations. Also, LSO India, which is a sub department of External Sales, was included in the research. SMES Components has six LSOs, which are local sales and services offices. In order to simplify the models created in this research, only LSO India was included. The models created are also applicable to the other LSOs. The managers of the included departments are
occupied with controlling and coordinating the work of their respective department and are not directly involved in sales processes. Therefore, they were not included in this research. The roles fulfilled within SMES Components that were included in this research are LSM, (K)AM, TAM, SSE, Sales SSE India, and Project Manager TS.

The LSM is responsible for the total sales of in the aftermarket (spare parts and services) in its region. Account Managers support the LSM, by being the first contact for a specific group of customers within a specific region. Besides that, SMES Components has for its most important customers KAM who are responsible for the total sales of in the aftermarket (spare parts and services) for a specific customer. SSEs have an administrative role. They support the LSMs and (K)AMs by coordinating and processing the RFQ and RFO. SSEs operate within the LSO or from the central office in The Netherlands. TAMs fulfill a technical consultancy role for the customer and are a customer’s first contact for technical issues. They closely cooperate with the (K)AMs and regularly visit the fleet of the customers. Their job is to identify leads and initiate follow up. Project Managers TS are responsible for the execution of paid service jobs, supporting the commissioning of new build vessels and the settlement of claims.

C.3.3 Organization chart of the Warranty department

Figure 27 shows the organization chart of Warranty. The roles fulfilled within SMES New Build that were included in this research are Project Leader Warranty and Field Engineer Warranty. The Project Leader Warranty is responsible for the settlement of claims concerning a new build vessel. The Field Engineer Warranty executes service jobs during the warranty period of a ship.

![Organization chart of the Warranty department](image_url)
C.4 As-is – Organization level: Process dimension

C.4.1 As-is: Process descriptions

Visiting customer
The visiting customer process refers to both sales planning activities (visits are part of the sales plans) and lead management (visits to follow up a lead). This process is applicable to the sales functions of both new build and after sales. Sales representatives visit their customer(s) periodically. The reason for a visit can be a customer request to come by, to follow up an important lead, or because it has been a while since the last visit. During the visit, ongoing matters of the customer are discussed. After the visit, the sales representative summarizes the most important findings in a visit report, which is sent by e-mail to other sales representatives on a need-to-know basis.

Preparing visit to customer
This process is a sub process of the visiting customer process and describes the preparation of a customer visit. In order to have a comprehensive view of all ongoing matters regarding this customer, the sales representative gathers all relevant information on the concerning customer prior to the visit. This includes, for example, the status of pending quotations, progress of sales orders, outstanding claims and complaints, fleet information and dredge project information.

Lead management – New build vessels
The lead management process for new build activities concerns the follow up of signals indicating that existing customers are planning to extent their fleet or to replace one or more vessels, and signals indicating that a new player is planning to enter the dredge market. By following up these signals, area managers hope to receive a new RFQ.

Lead management – New build parts & after sales
The lead management process for new build parts and the aftermarket follows basically the same steps as the lead management process for new build vessels. The reason to model this process separately is the difference in responsibilities of the involved representatives (due to the separation between the sales function for new build vessels and new build parts/after sales) and the difference in information flow (leads are registered for new build vessels, but not for new build parts or after sales.

Offering - new build vessels
The offering process for new build vessels describes the steps to create and send a quotation to the customer concerning new build vessels. After the quotation is send and the customer is interested, the contract negotiations start. If the negotiations proceed successfully, this results in a new sales order.

Offering – New build parts & after sales
The offering process for new build parts and after sales describes the steps to create and send a quotation to the customer concerning parts for new build vessels, spare parts, or service activities. If the customer accepts the quotation, a new sales order is created. The offering processes for new build vessels, new build parts and after sales are executed by different departments, which have different systems in place to support these processes. The different systems influence the information flow, and therefore, these processes are modeled separately. It is important to note that this process can both be executed at the central office of SMES Components in The Netherlands, or at one of the LSOs.
Claim settlement – new build vessels
The claim settlement process addresses the warranty service phase indicated in table Y and shows the course of the settlement of submitted warranty claims. The warranty period of a new build vessel is one year, allowing the customer to get failing components on board of the vessel repaired or replaced at the costs of SMES. In case it concerns a component that was originally supplied by another BU, the respective BU is informed and asked to solve the claim. Since the scope of the warranty phase is limited to Warranty and SMES Components, the only sub process modeled is the claim settlement by SMES Components. Since SMES Components is the only BU involved in the process, only this sub process is included in the model of the claim settlement process for new build vessels.

Complaint and claim management – New build parts & after sales
The complaint and claim management process for new build parts & after sales refers to both the warranty service phase (for the settlement claims) and the customer support phase (for dealing with complaints). Complaints and claims can come from customers directly, or, if it concerns a claim regarding a component on board of a new build vessel, it is received from Warranty.

Customer support – New build parts & after sales
The customer support process describes the respond to any customer request that is not a RFQ, complaint or claim. Examples of request handled by this process are questions regarding an invoice, a request to send a product manual or product certificate and questions regarding drawings or bill of materials. The execution of this process is the responsibility of the Sales Support department in The Netherlands. In order to respond appropriately to the customer request, the support of other departments is frequently required.
C.4.2 Legend for the process flow diagrams

<table>
<thead>
<tr>
<th>Icon</th>
<th>Legend</th>
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</thead>
<tbody>
<tr>
<td><img src="image" alt="Start/End of process" /></td>
<td>Start/End of process</td>
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<tr>
<td><img src="image" alt="Process step" /></td>
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<tr>
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<td><img src="image" alt="Source other than document or system" /></td>
<td>Source other than document or system</td>
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<td><img src="image" alt="Process flow" /></td>
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</tr>
</tbody>
</table>

**Legend**

- **R**: Responsible
- **A**: Accountable
- **S**: Supports
- **C**: Consults
- **I**: Informs

Responsibilities on the same line as the process step

**Figure 28 – Legend for the process flow diagrams**

66
C.4.3 As-is: Process flow diagram ‘Visiting customer’

Figure 29 – As-is: Process flow diagram ‘Visiting customer’
C.4.4 As-is: Process flow diagram of the ‘Preparing visit to customer’ process

Start

Sales pipeline

Sales pipeline - new build

Sales order status

Collect quotation information

Status of:
- current quotations

Report of outstanding payments

Collect status of payments

Collect status of current orders

Status of:
- current orders

Collect other information

- Leads
- Complaints
- Issues
- Claims
- Dockings
- Projects
- Etc.

End

Sales pipeline - new build

- Fleet list
- List of dredging projects

Service- and visit reports

Dockings

Figure 30 – As-is: Process flow diagram of the ‘Preparing visit to customer’ process
C.4.5 As-is: Process flow diagram of the ‘Lead Management – New build vessels’ process

Figure 31 – As-is: Process flow diagram of the ‘Lead Management – New build vessels’ process
C.4.6 As-is: Process flow diagram of the ‘Lead Management – New build parts & after sales’ process

Figure 32 – As-is: Process flow diagram of the ‘Lead Management – New build parts & after sales’ process
C.4.7 As-is: Process flow diagram of the ‘Offering – New build vessels’ process

Figure 33 – As-is: Process flow diagram of the ‘Offering – New build vessels’ process
C.4.8 As-is: Process flow diagram of the ‘Offering – New build parts & after sales’ process
C.4.9 As-is: Process flow diagram of the ‘Claim settlement – New build vessels’ process

```
Figure 35 – As-is: Process flow diagram of the ‘Claim settlement – New build vessels’ process (page 1)
```
In case service is executed in the field:

[customer agrees]

[customer does not agree]

In case of Warranty claim:

Figure 36 – As-is: Process flow diagram of the 'Claim settlement – New build vessels' process (page 2)
C.4.10 As-is: Process flow diagram of the ‘Complaint and Claim Management – New build parts & after sales’ process

Figure 37 – As-is: Process flow diagram of the ‘Complaint and Claim Management – New build parts & after sales’ process
C4.11 As-is: Process flow diagram of the ‘Customer support – New build parts & after sales’ process

[Diagram of the process flow showing decision points and departments involved.]
C.5 As-is: System level – Process dimension

C.5.1 As-is: UML component diagram Accountview

![Accountview Diagram](image)

Figure 39 – As-is: UML component diagram of Accountview

C.5.2 As-is: UML component diagram Claim Registration Program

![Claim Registration Program Diagram](image)

Figure 40 – As-is: UML component diagram of Claim Registration Program

C.5.3 As-is: UML component diagram Hyperion

![Hyperion Diagram](image)

Figure 41 – As-is: UML component diagram of Hyperion

C.5.4 As-is: UML component diagram MS Outlook

![MS Outlook Diagram](image)

Figure 42 – As-is: UML component diagram of MS Outlook
C.6 As-is: System level – Data dimension

C.6.1 As-is: UML class diagram Accountview

Figure 43 – As-is: UML class diagram of Accountview

This data model applies to P&S database and Dredgers database of accountview

C.6.2 As-is: UML class diagram Claim Registration Program

Figure 44 – As-is: UML class diagram of the Claim Registration Program
C.6.3 As-is: UML class diagram MS Outlook

Figure 45 – As-is: UML class diagram of MS Outlook

C.6.4 As-is: UML class diagram Intranet

Figure 46 – As-is: UML class diagram of Intranet
C.6.5 As-is: UML class diagram ii-Desk

![Diagram of ii-Desk class model](image)

Figure 47 – As-is: UML class diagram of ii-Desk

C.6.6 As-is: UML class diagram SMES Components Complaint database

![Diagram of SMES Components Complaint database class model](image)

Figure 48 – As-is: UML class diagram of the SMES Components Complaint database

C.6.7 As-is: UML class diagram SMART

![Diagram of SMART class model](image)

Figure 49 – As-is: UML class diagram of SMART
C.7 As-is: System level – Network dimension

C.7.1 As-is: UML component diagram of the SMART – Accountview SMES New Build interface

![Diagram of interfaces between SMART and Accountview SMES New Build](image)

IF1: Accountview imports journal entries from SMART
IF2: Accountview imports master data of customers from SMART

Figure 50 – As-is: UML component diagram of interfaces between SMART and Accountview SMES New Build

C.7.1 As-is: UML component diagram of the interfaces of Hyperion

![Diagram of interfaces of Hyperion](image)

IF3: Any prespecified data

Figure 51 – As-is: UML component diagram of the interfaces of Hyperion
### C.8 As-is: System level – People dimension

<table>
<thead>
<tr>
<th>Role</th>
<th>System</th>
<th>HARP</th>
<th>SMART</th>
<th>Account-view SMES Components</th>
<th>Account-view SMES New Build</th>
<th>Outlook***</th>
<th>Intranet</th>
<th>ii-Desk*</th>
<th>Complaint DB SMES Components</th>
<th>Claim Registr. Program*</th>
<th>Hyperion**</th>
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</tbody>
</table>

1) i-Desk and the Claim Registration Program are web-based systems and, sales representatives throughout the organization can get access to these systems on request.

2) In principle, each representative can request access to the OLAP tool Hyperion. Based on one’s account rights, one can access different reports or even create reports.

3) Every representative (accept Agents) has a MS Outlook account. One can only access one’s own account.

| Table 13 – As-is: Component access |
# C.9 Validated as-is models

<table>
<thead>
<tr>
<th>Level</th>
<th>Dimension</th>
<th>Model</th>
<th>Validated</th>
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<tr>
<td>Scope model</td>
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<td>Table: selected activities</td>
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<td>People model</td>
<td>Table: selected entities</td>
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<td>Process flow diagram: Visiting customer</td>
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</table>
Appendix D: Models of the to-be situation

D.1 To-be: Relationship between process models and system models
D.2 To-be: Organization level: Process dimension

D.2.1 Differences in process descriptions of to-be models

The differences between the descriptions of the processes of the to-be situation compared to the processes of the as-is situation are:

- The ‘Lead management – new build vessels’ process and ‘Lead management - new build parts & after sales’ are merged into the single process ‘Lead management’;
- The ‘Preparing visit to customer’ process is not applicable to the to-be situation.
D.2.2 To-be: Process flow diagram of the ‘Visiting customer’ process

<table>
<thead>
<tr>
<th>Visiting customer</th>
<th>Page 1/1</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Process Flow Diagram" /></td>
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</tbody>
</table>

Figure 53 – To-be: Process flow diagram of the ‘Visiting customer’ process
D.2.3 To-be: Process flow diagram of the ‘Lead management’ process

Figure 54 – To-be: Process flow diagram of the ‘Lead management’ process
D.2.4 To-be: Process flow diagram of the ‘Offering – new build vessels’ process

Figure 55 – To-be: Process flow diagram of the ‘Offering – new build vessels’ process
D.2.5 To-be: Process flow diagram of the ‘Offering – new build parts & after sales’ process

Figure 56 – To-be: Process flow diagram ‘Offering – new build parts & after sales’ (page 1)
D.2.6 To-be: Process flow diagram ‘Claim settlement – new build vessels’

Figure 58 – To-be: Process flow diagram of the ‘Claim settlement – new build vessels’ process (page 1)
Figure 59 – To-be: Process flow diagram of the ‘Claim settlement – new build vessels’ process (page 2)
D.2.6 To-be: Process flow diagram of the ‘Complaint & claim management – new build parts & after sales’ process

Figure 60 – To-be: Process flow diagram of the ‘Complaint & claim management – new build parts & after sales’ process
D.2.7 To-be: Process flow diagram of the ‘Customer support – new build parts & after sales’ process

Figure 61 – To-be: Process flow diagram of the ‘Customer support – new build parts & after sales’ process (page 1)
Figure 62 – To-be: Process flow diagram of the ‘Customer support – new build parts & after sales’ process (page 2)
D.3 To-be situation: System Model – Data dimension

D.3.1 To-be: UML class diagram web portal

Figure 63 – To-be: UML class diagram of the web portal
D.3.1 To-be: UML class diagram CRM system

Figure 64 – To-be: UML class diagram of the CRM system
D.4 To-be: System level – Network dimension

Figure 65 – To-be: UML component diagram of the Interfaces of the CRM system