Gränsnitt mellan marknads- och utvecklingsavdelningarna - en fallstudie

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Interface between the Marketing and Sales and Product Development departments
A Case Study

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This thesis work is performed at Jönköping Institute of Technology within the subject area of Production Development and Management. The work is part of the university’s two-year Master's programme in Production Systems. The authors are responsible for the given opinions, conclusions and results.

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Globalization creates for companies’ new opportunities for business development, as well as new challenges. One of the most prevailing challenges is the ability to create new products and services in accordance to diverse customer needs and requirements, as well as implementation of new technologies in future lines of products. Therefore, companies realize the importance of the Marketing and Sales (M&S) and Product Development (PD) departments. The interface between those two departments plays a decisive role in realization of customer needs and requirements, and application of the right technologies in new products. The speed and accuracy with which the information between the M&S and PD department is exchanged directly influences success of one’s products on the market. Consequently, companies strive to achieve greater level of cross-functional integration within the interface, by overcoming barriers to integration, and improving the quality of internal services by utilizing computer based Information Systems (IS). The role of IS in supporting cross-functional work environment is growing, thus companies of all size make investment in IS. Nonetheless, these investments very often fail or not bear expect results, due to lack of alignment of the investment with the business.

This thesis documents a diagnosis undertaken for the Case Company. In recent years the Case Company experienced rapid international expansions and fast growth, which in turn exposed a whole new range of problems. The existing work routines turned out to be inadequate to maintain international expansion and growth. A great deal of these problems was enrooted directly in the interface between the M&S and PD departments. Therefore, the company realized a need to isolate and eliminate them, and further foster the cross-functional integration and information flows within the interface by implementation of a computer based Information System.

The purpose of this thesis is to enhance the understanding of the integration and communication process within the M&S and PD departments at the Case Company. In order to fulfill the purpose the Enterprise Knowledge Development modelling technique was employed. This allowed tracing the problems to their roots, by mapping business processes, goals, rules, actors, as well as clarification of concepts. As a result an objective snapshot of the current cross-functional integration between the M&S and PD departments was created. Further, this snapshot was compared against a great body of literature in the field of Product Development and Management and Process Management. The comparison made it possible to indicate areas for potential future improvements. The proposed change needs aimed at enhancing the internal customer satisfaction. Last but not the least in deep analysis of the current cross-functional relations within the interface made it feasible to suggest (with literature assistance) initial vital functions of a computer based Information System to enhance the integration and information flows within the studied interface at the Case Company. The proposed functionality corresponds to the current, as well as anticipated needs of the interface that has been derived based on requirements of the actors to fulfill goals and satisfy organizational processes.

**Keywords:** Marketing and Sales, Product Development, Interface, Integration, Information System, Internal Service Quality, Internal Customer Satisfaction,
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1 INTRODUCTION

This chapter is an introductory chapter. It aims at providing the reader with basic information concerning the problem situation, describing the problem itself, as well as its setting. Furthermore, the purpose, research questions, and implications of this study are presented. Last but not the least the limitations of the research are elaborated.

1.1 Background

Looking at the surrounding environment it is easy to observe the ever-growing pace of change. It touches every discipline and affects directly or indirectly life of all individuals. This evolution becomes especially apparent in the field of technology, where leading innovative solutions become obsolete before accommodating for good as dominant industry standards. Fierce competition and constantly changing customer requirements cause that no company can be certain about its market position in the future. The generic strategy frameworks for developing and sustaining competitive advantage described at first by Micheal Porter (1980) become irrelevant. Companies need to find new sources of competitive advantage. For the competitive advantage of any company, particularly manufacturing companies, the personalized customer plays an important role. Companies try to involve customer as a part of a value creating network, and thus secure fast responsiveness to the market (Bergman & Klefsjö, 2007).

Marketing and Sales (M&S) and Product Development (PD) departments are organizational units that through communication with external customers and partners try to understand and subsequently satisfy emerging expectations concerning new products and services. Their agility in capturing and interpreting signals from the external environment affects directly short and long run organizational performance, and therefore shapes the future of one's organization. In this thread of thoughts, it becomes apparent the role of integration and speed with which information is transferred between the M&S and PD departments to ensure high quality of performed work. One prerequisite for realization of the fore mentioned argument is availability of a robust Information System (IS). This system will not only enhance the accuracy of the decision making process, but also reduce the time needed to take an action (Curtis & Cobham, 2008). Research conducted by Gulati (2007) is aligned with the above mentioned statements. It outlines four fields critical to companies' success: external focus on building connections with value network of customers, internal coordination, cooperation, and capability development (Gulati, 2007).

Quality of performed work implies constant development and improvement of processes and in turn products that meet customer requirements. Therefore, companies need to emphasize on quality improvement philosophies and techniques such as Total Quality Management (TQM) and Knowledge Management (KM). TQM plays crucial role for an organization since it aims at “active prevention, change, and improvement rather than control and repair” (Bergman & Klefsjö, 2007, p.34). On the one hand TQM as a philosophy emphasizes on five critical success factors for a company such as: customer view, focus on the processes, decisions based on facts, commitment by every employee, continuous improvements (Bergman & Klefsjö, 2007). In such a way it creates an environment in which a robust Information System can be developed. On the other hand, KM facilitates the process of creating and managing a system that routinely and systematically ensures that people have the knowledge they need in any circumstances to make the right decisions. KM is
considered as a part of organizational memory that prevents companies from losing their accumulated knowledge and experience created in many different ways such as: execution of daily operations; improving existing work routines; reengineering of business processes; planning for the future demands; learning from mistakes, etc. (Persson, Stirna & Ågestam, 2008). From these considerations, it is clear that companies need to put a lot of effort to capture valuable knowledge by building models and mind maps, using abstract terms, as well as writing down experiences. Information transformed into knowledge is the factor that allows both organizations and individuals within organizations to make the right decisions and subsequently to take effective and timely actions. To manage the knowledge an appropriate IS needs to be developed.

In the late 1980's great writers in management of our time such as Peter Drucker argued that creation of "an information-based organization" is possible without implementing advanced data processing technologies (Drucker, 1988). What was recognized as two factors that enable companies to obtain efficient innovation processes and flexible adaptation to the market fluctuations were people and their knowledge (Nonaka, 1991). Today however the cost of processing power and storage capacity has decreased enormously. This decrease went in pair with better user awareness and acceptance of technology in the workplace. Therefore, organizations of all sizes invest in Information Systems (IS) and Information Technology (IT) infrastructure, and thus improve the quality of decisions made by employees, the output of business processes, and final products delivered to external customers. Consequently, the quality of performed work is a strategic issue that can enable companies to exceed customers' expectations. This is a way in which companies are able to create loyal customer base (Bergman & Klefsjö, 2007).

1.2 Problem

In a turbulent environment the key to survival and growth lies in companies' ability to recognize environmental changes and share ideas, which are crucial success factors in the new product development process (Awad & Ghaziri, 2004). Owing to the fact that the product development is a cross-functional activity the need for integration between the departments involved in the development process is acknowledged. M&S and PD departments are among the most important to understand and realize the desirable customer focus in new products. As a result the fore mention departments need to be integrated to the highest possible degree, to improve the internal service quality, and hence maximize the internal customer satisfaction. This is true, since the delivered functions throughout the organization can predetermine successes of a company in terms of performance and customers' satisfaction. Poor quality of the internal business processes of a manufacturing company can lead to difficulties such as unmet customer requirements, costs related to change, rework, delays, longer lead times, and long time-to-market. That is why, companies need to optimize processes performed locally by organizational functions and at the same time assure good cross-functional connections between the different departments (Bergman & Klefsjö, 2007).

Therefore, companies recognize a need to invest in IS/IT that will foster the integration by not only supporting existing communication channels but also create new connections between employees, especially in the most dispersed departments of an organization. Thus, enabling sharing information in a timely manner and uniform format to assist in decision making by all employees connected through the computerized Information System.
Investments in IS/IT infrastructure, however, very frequently are unable to deliver expected value to the business, by failing to reach intended level of interaction with users or to meet stakeholders' expectations (Yeo, 2002). There are many theories concerning the reasons why Information Systems fail so frequently. To begin with, there is a lack of balance between investments made in infrastructure designated to run the business and investments facilitating creation of the environment in which a change is possible. The figures by KPMG estimate imbalance equal to 70-90% in favour of investments to run the business (Information Age, 2008). Among other reasons is inability of management to recognize and evaluate the business requirements that the system must meet and the fit in the currently owned IT infrastructure and application portfolio. The key to success is alignment of the investment along three dimensions: business strategy, organizational strategy and information strategy (Pearlson & Saunders, 2010). Consequently, this requires a careful process of planning, evaluation, and assessment of the present situation, and based on it, develop business requirements for the IS/IT.

1.2.1 Context of the thesis

This thesis is a master level project carried out by two students from "Production Development and Management" and "IT and Management" departments at Jönköping University. It is an examination in order for the students to obtain degrees in Industrial Engineering and Informatics. Respectively, the project work is carried out in collaboration with a company referred to in this thesis as "the Case Company".

1.2.2 Company presentation

The Case Company was established in 1945. Thanks to its strategy concentrated on targeting particular market segments the company grew fast. At present the Case Company has approximately 2000 employees worldwide. The companies' Sales Offices are located in 17 countries and production is carried out in Europe and Asia.

The Case Company product portfolio consists of three main business areas (The Case Company, 2010):

- Professional Lighting - sales of indoor lighting for public environments
- Retail Lighting - sales of lighting systems, lighting sources and services to retail stores
- Outdoor Lighting - sales of outdoor products for the lighting of buildings, parks, recreational areas, paths, etc.

The company aims at "creating energy-efficient lighting solutions contributing to an ergonomic environment on an international arena" (The Case Company, 2010). The Case Company has ambitions to become a leading global player within the lighting industry, at the same time maintaining its dominant position in the Nordic region and among top lighting companies in Europe by maximizing its value for customers and shareholders.

To realize its goal and become a global player the company decided to focus on acquisitions of competitors with interesting business portfolio and potential. Offensive acquisition strategy allowed the company to grow fast on the international arena. Each year the company managed to sustain double-digit net sales and profits. Nonetheless, the initial rapid
growth was temporary, and uncovered all weaknesses of the current work system. The ex-
isting work routines and practices turned out to be not suitable to the new environment.
Previously silent problems surfaced and new ones appeared. The company faced a chal-
lenge to improve organizational core processes to meet international standards, to connect
geographically dispersed business units, and to incorporate diverse customer requirements
in new product lines. A solution for solving part of organizational problems the company
saw in implementation of a new standardized computer based Information System in all
branches of the company. This had to be done while maintaining high levels of adaptability
to the changes in the external environment in order to be successful and survive on the
market. As a result the Case Company decided to implement a modular system based on
principles of service oriented architecture (SOA). This ensured new system cost efficiency,
flexibility, and agility. Chunks of the system were progressively implemented in different
departments to soon cover logistics, production, and finance. At present the company pre-
pare itself for implementation of the system in two remaining departments, namely M&S
and PD. The interface between these two departments has been identified as a source of
many prevailing problems, due to lack of proper integration. Therefore, the company real-
ized a need to carefully assess the current situation, isolate the problems, find their root
causes, and try to alleviate them by implementing appropriate Information System.

1.3 Purpose
The purpose of this thesis is to enhance the understanding of the integration and commu-
nication processes within the M&S and PD interface at the Case Company, and thus to en-
hance the internal customer satisfaction in both departments. Through better information
exchange within the specified interface customers’ requirements can be better understood,
therefore the time-to market for new products can be decreased, and the quality of prod-
ucts increased.

The focus of the thesis is put on two critical areas, namely:

- an effective integration of marketing and product development function,
- enhancement of the internal customer satisfaction within the M&S and PD inter-
face,

through creating a reliable and robust information flow. These areas are recognized as criti-
cal determinants in the process of developing and sustaining competitive advantage, there-
fore leading to companies’ success (Gulati, 2007).

It is intended that the optimization of the information exchange flow will be reached by
outlining initial business requirements for a computerized support Information System to
be implemented in both departments. The IS functionality will be based on the needs of
actors in both departments to realize organizational goals, as well as to fulfil needs of pre-
sent and planned processes.

1.4 Interested parties
It is intended that the results obtained during the analysis will benefit not only the Case
Company as the problem owner, but also wider audience of managers in companies facing
difficulties with integrating the marketing information into new product development. For
every company an important element of competitive advantage is the opportunity to create
tailor-made products to customers. The customization issue becomes even more complex
when companies' markets are dispersed around the world, and the development of a prod-
uct needs to be adapted to local requirements. Proposed functionality of the IS to support
the work of M&S and PD departments can be adjusted by managers to cope with similar
issues.

1.5 Research questions

In connection to the purpose the following research questions were specified:

RQ1 - How can the current integration between the Marketing and Sales and Product Development de-
partments during the product development process at the Case Company be described?

RQ2 - What change needs can be suggested to enhance the internal customer satisfaction within the studied
interface?

Answering the RQ1 calls for exploration of the following areas: identification and mapping
of processes owned by both departments, recognition of actors involved and rules govern-
ing these processes, clarification of concepts, as well as deep understanding and prioritiza-
tion of goals of both departments. This will help the authors to understand how the data
and information is captured, packed, stored, and transferred across the departments. Based
on analysis performed to answer the RQ1 several areas for future improvement are sug-
gested. The suggested improvement areas are answer to the RQ2.

RQ3 - What are the initial vital functions of computer based Information System/-s necessary for high level
of integration and enhancement of information flows within the studied interface at the Case Company?

Answering the RQ3 calls for identifying business requirements for a computerized IS to
support decision making within both departments. This goal will be reached based on the
results obtained from the RQ1.

1.6 Delimitations

The scope of the research will be solely focused on the interface between M&S and PD
departments.

Due to the fact that this thesis is inter-disciplinary and regards theoretical aspects of engi-
neering and information management there exist a great amount of relevant literature. The
literature included within the thesis is in the fields of Product Development Management,
Process Development and Management, Total Quality Management, Business Develop-
ment, Business Modelling and Information Systems Management.

The suggestions and proposed areas for future improvements are conceptual and based on
the analysis. The change needs are expected to answer only questions "what?" and "why?"
to change. Consequently, the question as to "how?" to carry on the change process is not
covered by this thesis. This aspect is left to the Case Company. The company needs to de-
cide on suitable measures to fulfil the change needs. Furthermore, the authors do not per-
form analysis of cost or any other calculations concerning financial aspects of implement-
ing proposed change needs.
Another set of limitations is related to the use of the modelling approach as a tool for analysis. It is crucial for the model to contain the right amount of information and to reflect the reality in an accurate way (Holt, 2009).

According to Holt (2009) process partitioning depends on the organizational design and the application nature of the process. Another constraint that comes from the nature of the process modelling is the fact that in the real working conditions many of the processes have a high degree of iteration which leads to the possibility of high levels of complexity.

1.7 Structure

The thesis is organized as follows. The first chapter is an introduction to the thesis, it briefly clarifies the problem situation, specifies the aims of the thesis, parties of interest in the project and its limitations. The second chapter introduces the reader to a framework used to support the investigation of the problem situation. The chapter three focuses on explanation and justification of method chosen to analyze and solve the problem situation. Chapter four is concerned with results obtained during the interviews. Chapter five introduces the reader to the conducted analysis for the Case Company. Throughout this chapter RQs are answered. Chapter six presents the general conclusions derived from the analysis. In addition, future research recommendations and discussion concerning applicability of the findings are included in the chapter.
2 THEORETICAL BACKGROUND

This section introduces the reader to the theoretical framework associated with the scope of the thesis. The literature was selected based on its relevance to the problem subject and purpose of the thesis. Special focus was put on theories which were able to provide the basis for answering the research questions specified in Section 1.5. More specifically, the literature was divided in three broad sections covering different scientific areas. The first area incorporated in Section 2.1 includes literature in the field of Product Development Management. This theory assisted the authors in understanding the interface between the Marketing and Sales (M&S) and Product Development (PD) departments. Therefore, it gave the basis for answering the RQ1. The second area introduced in Section 2.2 covers aspects of Business Development, and Process Development and Management. The literature chosen from this area articulates the quality of inter-organizational services and internal customer satisfaction. Furthermore, Section 2.2 incorporates justification of the chosen approach, as well as detailed description of the technique used for analysis (The Enterprise Knowledge Development). Consequently, it guided the authors through the process of answering RQ1, RQ2, and RQ3. The third area presented in Section 2.3 deals with aspects of Information Systems Management. The theory included in this section covers the supporting role of Information Systems (IS) and Information Technology (IT) in the workplace, and thus facilitates answering of the RQ3.

2.1 Interface between Marketing and Sales and Product Development departments

A Product Development (PD) department is an organizational function where new products or product improvements, on the basis of information delivered by other functions such as: Marketing and Sales, Production, Technology development, are designed. Together these functions determine the success of a product development process in terms of performance dimensions such as: product quality and cost; development time, cost; and capability (Ulrich & Eppinger, 2008). Therefore, the integration between these functions appears to be one of the most decisive factors for successful New Product Development (NPD) process (Kahn, 1996; Maltz et al., 2001). In addition, Bergman and Klefsjö (2007) stress the importance of quality of communication channels that supply PD department with critical information, as a valuable prerequisite for high level of cross-functional integration. Consequently, the improved information exchange between the above mentioned organizational functions is able to support the decisions made in the PD department concerning the development of future products (Bergman & Klefsjö, 2007).

The scope of this thesis limits the authors to consider exclusively integration issues and quality of information exchanged between M&S and PD departments. During the following three sections: 2.1.1; 2.1.2; 2.1.3, by the use of relevant theory, the authors aim at:

- clarifying the involvement of marketing function within product development process, according to the literature in the field of Product Development Management;
- categorizing information delivered by the marketing function during the NPD process;
- outlining factors that positively or negatively influence the integration of the marketing function onto the product development process.
2.1.1 Marketing function in the product development context

Examination of involvement of the marketing function within product development process initially requires a brief overview of the cross-functional approach for the product development process. Figure 2.1 visualizes graphically the integration of the processes needed for a new product development. The section marked with a black dashed line represents the interface between the M&S and PD departments. Moreover, this figure develops six stages; based on the investigated theory in the field of Product Development Management; of the NPD process, as well as the main tasks that need to be completed in each stage.

![Figure 2.1 - Integrated product development process (Based on: Bergman & Klefsvjö, 2007, p.108).](image)

The six iterative stages incorporated into a NPD process allow transferring the technical and marketing input into new products. This process implies reduction of various types of information uncertainties such as unmet customers’ requirements, newly developed technical solutions, competitors’ activities and products, or available resources (Bergman & Klefsvjö, 2007). Moenaert et al. (1994) argue that the success of a new product depends highly on effectiveness with which market and technical uncertainties are reduced. Hart et al. (1999) is in line with this argument and advocate that a majority of uncertainties is related to customers’ needs and expectations.

Managing development of new products demands from the company investigation of several strategic questions such as (Tang, 2010):

1. When should new products be launched?
2. What is the expected performance of the product within dynamic market?
3. How should the introduction of new products to the market be managed?
4. What is the appropriate price for the new product?
5. What is/are the channel/-s for selling the new product?

The main concern of the M&S department is reduction of market uncertainties through informing all organizational processes about superior values for the customer (Ulrich & Eppinger, 2008). Thus market intelligence should be present in each function concerned with the NPD process. Gupta et al. (1985) refer to this concept as market orientation. Market intelligence is information associated with company’s market. This information is gathered and analyzed for the purpose of making decisions concerning the market opportunities,
market development metrics and so on. Further, Hart et al. (1999) stress the fact that the market orientation addresses dissemination and utilization of marketing information.

For the purpose of this thesis a broad definition explaining the marketing information concept is adopted. Marketing information is “information concerning the marketing activities of the firm, their impact on and interaction with the market and their effectiveness in achieving marketing objectives”, as well as “information including the dominant economic characteristics of an industry, factors determining competitive success, industry prospects for profitability etc” (Hart et al., 1999, p.21). Likewise, Tang (2010) explains that the marketing is externally-focused function that is mainly responsible for “what” kind of products organization should develop, for “which” location and “what” should be the pricing. Thus, it can be said that the marketing function monitors the market conditions and on their basis develops a marketing plan, which aims at increasing companies’ market share and revenue.

In order to investigate in detail the integration of the marketing function within the product development process Table 2.1 was generated. The table can be found in Attachment 4. Its content combines information concerning three important questions:

1. What phases and steps, incorporated in the product development process, require marketing information?
2. What type of information is input for each phase and step?
3. What is the overall output of each phase and step?

Table 2.1 represents a thorough exploration of the questions when, why, and what type of information is exchanged between the studied departments. This table is an important tool that allowed the authors to draw conclusions about the information requirements by the PD department in terms of marketing information. Further, better understanding of responsibilities of the marketing and product development function can be gained.

The literature review in the field of Product Development Management reveals that Bergman and Klefsjö (2007), Ulrich and Eppinger (2008) and Gupta et al. (1985) agree on the number of product development phases (six phases), as well as their sequence during the product development process. In general, the above mentioned authors have the same perception of the content of the product development process in terms of tasks and responsibilities of the studied functions. However, the authors differ in the way in which the phases are named, as well as in the way in which the content of each phase is organized. In order to simplify and reduce the confusion concerning phases’ names, their organization, and content the authors of this thesis referred further to the ones developed by Gupta et al. (1985). Gupta’s et al. (1985) explanations of the product development process are used since they are on a more general level, and thus are perceived as a mix of categorizations developed by Bergman and Klefsjö (2007) and Ulrich and Eppinger (2008). The authors of this thesis believe that the existing confusion of the phases’ names and arrangement of their content will not have negative impact on gaining deep understanding of the integration of the marketing information within actual product development.

The following paragraph is concerned with a brief summary of the M&S and PD department responsibilities during the NPD process based on phases’ names and content organization developed by Gupta et al. (1985). Further, the content of each phase is expanded in accordance to Table 2.1 (Attachment 4) and Figure 2.1 (above), as well as additional literature in the field of Product Development Management.
During the planning phase the marketing function is used for setting the product development project goals, whereas the product development function has a valuable input for defining future marketing goals. The product development input comprises information which articulate newly developed technologies or new applications of existing technologies (Gupta et al., 1985). Gupta et al. (1985), Ulrich and Eppinger (2008), Bergman and Klefsjö (2007) emphasize on early involvement of the M&S department into the NPD process. The authors put focus on the fact that product opportunities need to be identified not only by the PD department, but also by the M&S department. Marketing function has an important role for defining new product opportunities by investigating customers' complaints, customers' suggestions, lead users' desires, as well as study of competitors in certain markets (Table 2.1). The above mentioned researchers realize the need for development of a database by the marketing function that incorporates all promising ideas. Gupta et al. (1986) argue that the right product launch and resource allocation is a result of combined efforts of marketing and product development functions which are characterized with opposite perspectives for the product development time.

During the idea generation phase a high extent of marketing and product development functions integration contributes to identification of not only the most important needs but also needs that are not apparent to the customer (Gupta et al., 1986; Ulrich & Eppinger, 2008).

The idea screening phase requires inputs by marketing and product development functions since the product under development is primarily evaluated on the basis of two factors: the technical and market feasibility. Assessment of the market feasibility demands information concerning market size and growth, product risk analysis, as well as product fit with existing regulations (Gupta et al., 1986; Ulrich & Eppinger, 2008) (Table 2.1). In this phase the most promising ideas are evaluated. In addition marketing function is responsible for identifying the benefits for the customers concerning the new product idea (Ulrich & Eppinger, 2008).

The physical product development phase requires information by the marketing function which is mainly concerned with the price range, marketing perception of the product quality, beneficial product features for the customer, usage, and disposal of the product by the customer, or product safety. Consequently, it is clear the need to benchmark company competitors by the M&S department. Generally, it can be said that the M&S department responsibilities include defining the most desired and valuable product attributes for the customer, whereas responsibilities of the PD department encompass making decisions concerning the best technical solutions to meet specified customer requirements (Gupta et al., 1986). During this phase marketing function is involved in development of the product concept. This phase implies identification and subsequently communicating of customer needs to the other functions involved within the development process. Moreover, the marketing function is primary concerned with setting the target product specifications (Table 2.1). Further, the marketing function assists in identifying the most promising concepts and identifying weaknesses in various newly developed concepts (Ulrich & Eppinger, 2008). In addition, it is said that marketing function is involved in making decisions concerning the product functions. Bergman and Klefsjö (2007) add that after the decision concerning the product concept to be pursuit are made marketing function starts with preparation of the marketing campaign for the new product.

The tests and product commercialization phase is a phase where the product development function conveys to the marketing function information concerning product specifications, product attributes, product usage and disposal. Consequently, the marketing function uses
this information to promote the unique features of the new product to customers (Gupta et al., 1986). According to Maltz et al. (2001) high level of integration between M&S and PD departments will be achieved when representatives from both functions visit customers to obtain insights concerning customers’ reactions to the newly developed product.

During the test and product commercialization phase Gupta et al. (1985) recommend involvement of the product development function in the marketing campaign. The above mentioned involvement is beneficial if it is to a great extent in preparation of marketing materials, technical manuals, and to a less extent in consultation, advertising, and sales promotions. The M&S department in turn communicates the information about the customer evaluation of the product. Post commercialization phase requires analysis of the product development results. The analysis is concerned with the following issues (Gupta et al., 1985):

- the level of satisfaction by achieved market share and profit targets;
- the extent to which the product is used in a way that it was intended;
- how customer suggestions can be incorporated into new products;
- how competitors react to the new product;
- the extent to which customers’ complains are communicated to the PD department;
- the extent to which the customer has been delivered with the right information about the product features.

Checklist outlining areas for the product development and marketing integration in NPD process is presented in Table 2.2. This table was developed on the basis of the available literature in the field of Product Development Management.

<table>
<thead>
<tr>
<th>Areas for integration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A) The marketing function is involved with the product development function in</strong></td>
<td></td>
</tr>
<tr>
<td>1. Setting new product goals and prioritize</td>
<td></td>
</tr>
<tr>
<td>2. Preparing PD’ budget proposals</td>
<td></td>
</tr>
<tr>
<td>3. Establishing PD schedules</td>
<td></td>
</tr>
<tr>
<td>4. Generating new product ideas</td>
<td></td>
</tr>
<tr>
<td>5. Screening new product ideas</td>
<td></td>
</tr>
<tr>
<td>6. Finding commercial applications of PD’s new product ideas/technologies</td>
<td></td>
</tr>
<tr>
<td><strong>B) The marketing function provides information to the product development function on</strong></td>
<td></td>
</tr>
<tr>
<td>7. Customer requirements of new products</td>
<td></td>
</tr>
<tr>
<td>8. Regulatory and legal restrictions on product performance and design</td>
<td></td>
</tr>
<tr>
<td>9. Test- marketing results</td>
<td></td>
</tr>
<tr>
<td>10. Feedback from the customers regarding product performance on a regular basis</td>
<td></td>
</tr>
<tr>
<td>11. Competitors’ strategy</td>
<td></td>
</tr>
<tr>
<td><strong>C) The product development function is involved with the marketing function in</strong></td>
<td></td>
</tr>
<tr>
<td>12. Preparing marketing’s budget proposal</td>
<td></td>
</tr>
<tr>
<td>13. Screening new product ideas</td>
<td></td>
</tr>
<tr>
<td>14. Modifying product according to the marketing recommendations</td>
<td></td>
</tr>
<tr>
<td>15. Developing new product according to the market needs</td>
<td></td>
</tr>
<tr>
<td>16. Designing communication strategies for the customers of new products</td>
<td></td>
</tr>
<tr>
<td>17. Designing users and service manuals</td>
<td></td>
</tr>
<tr>
<td>18. Training users of new products</td>
<td></td>
</tr>
<tr>
<td>19. Analyzing customer need</td>
<td></td>
</tr>
</tbody>
</table>


2.1.2 Taxonomies of marketing information in the product development context

Conceptualization of the marketing information plays a crucial role in understanding of the best pattern for integration between the M&S and PD departments. Taxonomy is a proper way for outlining different types of marketing information used as an input during different stages of the NPD process. The taxonomy is presented in Table 2.3, which helps to understand what can or cannot be attained by using the marketing information. Further, this taxonomy stresses the main types of information that contributes to development of customer related products. It is necessary to consider the fact that sources of the marketing information are not exclusively external for the company, but also internal including information gathered across all organizational departments (Hart et al., 1999). The taxonomy of the marketing information is presented in Table 2.3.

<table>
<thead>
<tr>
<th>Macro Data</th>
<th>Industry information</th>
<th>Customer segment information</th>
<th>Customer purchase information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of buyers in market</td>
<td>Competitive forces</td>
<td>Buyer behaviour</td>
<td>Product usage Rates</td>
</tr>
<tr>
<td>Demographic changes</td>
<td>Rivals’ strength</td>
<td>Usage rates</td>
<td>Customer Satisfaction levels</td>
</tr>
<tr>
<td>Interest rates</td>
<td>Dominant economic characteristics</td>
<td>Demographic data</td>
<td>Benefits sought from purchase</td>
</tr>
<tr>
<td>Technology trajectory</td>
<td>Nature of competition (price/non-price)</td>
<td>Innovativeness</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>Prospects for Profitability</td>
<td>Psychographic and lifestyle data</td>
<td>-</td>
</tr>
</tbody>
</table>

Product newness is a factor that determines the utility of the marketing information in reduction of uncertainties within the NPD process. It is important to include the experience obtained from the previous projects in the “knowledge memory” of an organization. The organizational knowledge is developed over time and it concerns the rules acquisition, rules dissemination, and interpretation of the market information that are created by the company. It is a recognized connection between the newness of a product and the possibility to use organizational experience (successive generations of products) (Hart et al., 1999; Turban et al., 2008).

2.1.3 Important factors for cross-functional integration

The extent of integration between the M&S and PD departments plays a decisive role for a technical and commercial success of new products. Coupling M&S and PD efforts on the basis of nineteen areas outlined in Table 2.2 has potential to secure competitive advantages of a company (Gupta et al., 1985). Moreover, Moenaert et al. (1994) advocate that high level of integration is related to effective labour division, information exchange, and information use.

The cross-functional integration has a multidisciplinary character as it involves two basic elements: interaction and collaboration. The first basic element, interaction is associated with structured and formally coordinated cross-functional activities such as routine meet-
Collaboration as the second basic element of the cross-functional integration focuses on strategic alignment of interdependent departments by “affective, volitional, mutual/shared process where two or more departments work together, have mutual understanding, have a common vision, share resources, and achieve collective goals” (Kahn, 1996, p. 139). Further, informal structure is used to manage the relations. Interaction activities can be quantified and controlled, whereas collaboration activities are intangible, and therefore difficult to regulate (Gupta et al., 1985). Leenders and Wierenga (2001) are in line with the above mentioned arguments and put forward that interaction between functions is an indispensible part of the integration, but collaboration is determinant of the product development process success. Important to mention in this relation is that a mechanism for achievement of both basic elements for integration; interaction and collaboration is cross-functional communication (Gupta et al., 1985).

Further, factors which positively or negatively influence cross-functional integration are grouped in several categories in accordance to their pertinence to the above mentioned basic elements, namely interaction and collaboration. These categories are often interdependent (Morelli et al., 1995).

### 2.1.3.1 Factors related to interaction

The first group of factors is related to one of the elements of integration, namely interaction. These factors play a decisive role in realization of high level of interaction, and thus foster environment where a high level of integration between the M&S and PD departments can be achieved. These factors are coordination, cross-functional working relationships (CFRs), functional conflicts, as well as understanding and knowledge of the priorities of the peer managers’ issues.

A great deal of challenges in the studied interface arises due to the complex nature of the tasks and behavioural interdependencies. Therefore, coordination is perceived as an important factor that can be used for managing and overcoming of such type of challenges, and thus realizes an effective integration within the studied interface (Tang, 2010). The coordination plan is developed by means of iterative negotiations between the studied functions. That is why, it is important for the top management to encourage marketing and product development functions to have more interaction and to consult each other for development of the coordinative plan. Further, Massey and Kyriazis (2006) argue that a decisive factor for realization of successful cross-functional interaction is coordination of activities which helps in proper allocation of functional responsibilities.

Formal elements of any organization are goals, strategies, structures, administrative polices’ and procedures, and so on. These elements play a crucial role for coordination of employees’ behaviour. Goals are perceived as input for decisions made by employees, control their behaviour and actions. Organizational strategies are seen as “patterns of resource deployments and environmental interactions” (Porras & Robertson, 1992, p.730). Administrative polices and rules play a role in defining appropriate ways for conducting various organizational activities. Rules and procedures can be seen as “decisions made in advance of their execution” (Porras & Robertson, 1992, p.730).

Moreover, Parry and Song (1993) discuss that organizational formalization can have both positive and negative influence on the integration. Positive is when formalization helps in reducing role conflicts, and negative when complex procedures and rules hindering the
flow of information between the departments. Further, Parry and Song (1993) discuss that, physical distance is as an important factor that has a direct impact on the cross-functional interaction and informal relations between employees in an organization. Leenders and Wierenga (2001) are in line with this statement and posit the need to overcome interfunctional barriers such as physical separation.

One crucial factor that can contribute for a successful integration between the M&S and PD departments is cross-functional working relationships (CFRs) realized between directors and managers within the studied interface. CFRs between the marketing and product development functions are often problematic which imply the need for concentration of efforts and attention for solving these problems (Massey & Kyriazis, 2006). The need for improvement of the inter-functional relations is also argued by Maltz et al. (2001). Further, clarifications and mutually agreed solutions between the managers of the studied departments are perceived as an influential factor for achievement of interaction between the studied departments. This can be realized through the availability of proper feedback within CFRs.

Massey & Kyriazis (2006) argue that factors such as functional and dysfunctional conflicts need to be regarded in the discussions concerning cross-functional interaction. It is stated that results obtained from dysfunctional conflicts are negative such as information distortions; distrust, opportunistic behaviour, withholding of important information, as well as negatively affected decision-making process (Massey & Kyriazis, 2006). Conversely, functional forms of conflicts have a positive influence on the interaction. Therefore, the high level of interaction can be achieved by solving dysfunctional conflicts and encouraging functional ones.

2.1.3.2 Factors related to collaboration

The second group of factors is related to the second element of integration, namely collaboration. This group consists of factors such as mutual understanding and recognition, mutual objectives, and harmonious organizational climate.

Collaboration is an important element of the integration since it helps to overcome cross-functional conflicts (Tang, 2010). The most common causes of conflicts between the M&S and PD departments are due to the task dependency, functional specialization, sharing of scarce resources, ambiguously stated departmental responsibilities, and expectations (Souder & Chakrabarti, 1978). Moenaert et al (1996) name these conflicts inter-functional rivalry and define it as the extent to which the employees from one function perceive the employees from the other as competitors for scarce resources within an organization. Kahn (1996) is in line with above mentioned arguments and further explains that effectiveness of integration depends on defining the right degree of required collaboration which is influenced by cross-functional conflicts, as well as the degree of technical, marketing, and environmental uncertainties. Likewise, Tang (2010) emphasizes on the fact that response to market changes is reached when the marketing and product development functions jointly create a collaborative plan. By encouraging the above mentioned functions to develop a collaborative plan it is natural for the employees in the PD department to gain better understanding of the market dynamics and for marketing function to gain insights concerning product development capabilities. Thus, the marketing function establishes the “right” customer requirements and assures the “right” values to the customers. At the same time this plan allows product development function to develop the expected customer requirements and deliver the desirable values (Tang, 2010).
Parry and Song (1993) and Moenaert et al. (1994) discuss that a high level of collaboration within the studied interface is possible in case of achievement of mutual understanding, as well as recognition of the other function’s efforts. In this relation it can be add that understanding and knowledge of priorities and responsibilities of the employees from the other function is an important factor for achievement of cross-functional collaboration (Massey & Kyriazis, 2006).

Moreover, factor that assists in realizing the integration is Product Development Managers understanding of the important role of the marketing function for successful innovation process (Gupta et al., 1985). Parry and Song (1993) emphasize mutual corporate values, vision for the M&S and PD departments, and clearly stated departmental responsibilities put forward by Leenders and Wierenga (2001), as factors that contribute to high levels of collaboration.

Parry and Song (1993) advocate organizational strategy and environmental uncertainties as two factors that affect the level of collaboration, and subsequently integration. Moreover, Moenaert et al. (1994) argue that a factor that positively influences the cross-functional collaboration is clearly explained and articulated (by the top management) organizational strategy and objectives. Furthermore, Porras and Robertson (1992) argue that the degree of collaboration is connected to the organizational culture and climate. The quality of cross-functional climate is a crucial factor that positively or negatively influences the M&S and PD departments’ collaboration and integration. The harmony of cross-functional climate is a concept that is related to “positive degree of interest, trust, awareness, and support” between the two parties under investigation (Moenaert et al., 1994, p. 32). Parry and Song (1993) are in line with these arguments and state that when the relation between the departments is characterized by respect, trust, and commitment the rate of successful new product is higher. Parry and Song (1993) also recognize the need for reduction of differences between cultures in both departments. Leenders and Wierenga (2001) recognize the need to overcome barriers such as different language, different professional backgrounds, which result in delayed product launch, inefficient development; product with fewer customer benefits, among others. Thus, it is required that company puts efforts on reducing and eliminating barriers such as different “thought-worlds” and thus realizes high levels of cross-functional collaboration and integration. One of the most important factors for collaboration and integration, recognized by Parry and Song (1993), are business experience of the product development personnel and encouragement of risk-taking by the top management.

Gupta et al. (1986), Moenaert et al. (1996), Kahn (1996), Maltz et al. (2001) argue that enhancing cooperation is a factor that is highly connected to the cross-functional collaboration. Companies are required to put a lot of effort in realizing high levels of cooperation between the M&S and PD departments which will lead to increased usage of information transferred within the studied interface.

Conceptualization of the “information use” is essential since it gives insights concerning its importance for the cross-functional integration, as well as helps to understand how it can be positively influenced. Most of the techniques employed to achieve of cross-functional integration such as: co-locating functions, cross-functional teams, joint customer visits, motivation, ability, and opportunity for information processing aim at improving “information use” (Maltz et al., 2001). There exist two ways of “information use”. The first way is “instrumental use” which is associated with “using information to solve a particular problem or make a particular decision” (Maltz et al., 2001, p.70). As an example it can be given a situation where the product development personnel decide to add product feature on the
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The second way is “conceptual use” and refers to “using information in a way that changes thinking processes without leading to relatively immediate concrete action” (Maltz et al., 2001, p.70). “Conceptual use” is when the market information is not used for a specific project but changes the way in which managers think about the market, e.g. when managers use the received information to change their knowledge and understanding of the surrounding environment, to find more efficient ways to perform the work.

Inter-functional rivalry affects the perceived quality of information, and thus the use of marketing information. Perceived information quality determines whether the information is actually used for product development purposes. Moenaert et al. (1996) is in line and state that higher level of perceived quality leads to high level of “information use”. A technique used for achievement of higher quality of perceived information is trust. Higher level of inter-functional rivalry will lead to lower level of perceived quality. Thus it will decrease the motivation of “instrumental use” and “conceptual use” (Maltz et al., 2001).

2.1.3.3 Cross-functional communication

The authors discuss the cross-functional communication as an important and indispensable mechanism for realization of the above mentioned factors, and thus realize the two basic elements; interaction and collaboration; of the integration. The cross-functional communication favours integration mechanisms such as: establishing meetings on a regular basis, and developing of information networks for routing the standardized documentation. The primary aim is creation of an environment which fosters information transactions between departments and overcome barriers associated with physical distance (Kahn, 1996). Further, communication as a substantial element of the integration between the studied departments helps for achievement of market orientation in each function concerned with the NPD process (Gupta et al., 1985; Hart et al., 1999; Parry & Song, 1993). Therefore, this mechanism is a crucial determinant that can assure that product development employees have deep understanding and expertise not only in technical issues, but also they “excel in translating market needs into valuable products and gearing for anticipated needs” (Gupta et al., 1985, p. 289). In this thread of thought it can be said that communication is a prerequisite for achievement of coordination and cooperation (Maltz et al., 2001; Porras & Robertson, 1992).

Moreover, communication is characterized with three dimensions: communication frequency, bidirectional communication, and communication quality. Communication frequency implies intensity of the information exchanged between managers during meetings, telephone, reports, etc. The frequency dimension positively affects functional conflicts, but it has no effect on dysfunctional ones. Frequent communication can help to understand professional language and expressions of the employees in the other function (Massey & Kyriazis, 2006). Bidirectional communication represents a two-way direction of the information during the NPD process. The bidirectional relation can have a positive effect on functional conflicts and no effect on dysfunctional conflicts. It assists in encouraging useful discussions, and thus achievement of better CFRs (Massey & Kyriazis, 2006). However, Parry and Song (1993) argue that only bidirectional communication cannot overcome the existing differences in managers’ social identity and assist in better integration. Consequently, it is required this communicational dimension to be used in combination with others. Communication quality is the extent to which the information provided by the M&S department to the PD department is trustable, relevant, and useful. It is confirmed that
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high quality of information exchanged will have a positive effect on decision-making process, especially in situations with high level of uncertainties. Thus, managers within the studied departments are able to better assess all the options, assumptions and ideas. In addition it reduces the dysfunctional conflicts (Massey & Kyriazis, 2006). Thus internal communication is seen as vital mechanism that contributes to better employees’ motivation and understanding of company’s goals (Horovitz & Jurgens-Panak, 1994).

For successful NPD process it is important not only internal communication but also how the studied functions manage the communication with external customers. The following paragraph is concerned with factors important for open dialogue with the external customers. One of the most decisive factors is collaboration between the product development function and the marketing function. Employees from the PD department together with marketing and sales employees visit potential customers in order to understand to what extend customers are satisfied with existing products; how a product can be modified to better meet customer requirements; and whether are there any additional needs that customers want to be addressed (Horovitz & Jurgens-Panak, 1994).

2.1.3.4 Discussion concerning the cross-functional integration

In conclusion the following discussion can be presented concerning the integration issue. The interaction-based integration is characterized with competitive environment since it considers integration when certain information is exchanged between independent departments. Therefore, the selected departmental representatives and the information to be provided during the meetings are carefully chosen (Kahn, 1996). It is necessary to have a certain level of interaction but too much leads to too many meetings and overload with information (Leenders & Wierenga, 2001). Conversely, collaboration–based integration stresses continuous relations, and not just transactions between departments. Thus the internal environment is not competition, but cooperation. Collaboration requires change in the organizational climate and culture (Gupta et al., 1985).

Gupta et al. (1985) stresses the importance of collaboration – based integration. Top management should promote and encourage programs that will help in achieving understanding, informal relations, ascribe to the same vision, and share ideas/resources. These activities are strategic in nature, and thus any program that is developed should include modifications of a company’s strategic planning process and the company’s strategic planning implementation process. It is important to understand the collaboration issue when cross-functional teams are established. However, the existence of a network does not mean all the product development problems are solved. One possible reason is that cross-functional teams are temporary. That is why there is a need for initiatives that encourage not only team collaboration, but also cross-functional collaboration (Hart et al., 1999). Maltz et al. (2001) argue that some elements of interaction such as meetings and reports have positive effects, but the managers do not have to increase the number of meeting and the flow of reports for the sake of improving performance. It is suggested that the managers can use interaction to establish contact and familiarity between the departments and then use collaboration to drive the interaction process.

In conclusion it can be said that creating conditions which enable information exchange between the studied departments do not guarantee usage of the marketing information for the decision making purposes within the actual product development process. The reasons are associated with the inter-functional rivalry which hinders the work within the studied interface. This is due to the fact that the level of rivalry has inverse correlation to the level
of trust and the quality of perceived information. From these considerations it is easy to see the dependency between the level of rivalry and the number of innovations introduced into a company.

Further, by creating work environment where the information exchange and use is enhanced the authors reason that the quality of the internal customer service will increase. Moreover, as a result of increased quality of internal service the quality of performed work will be better. This is due to the fact that employees’ needs for information will be recognized and satisfied, as well as the working condition will be better. Thus, the employees will make the right decisions in a timely manner. The authors state that by increasing the quality of performed work the internal customer satisfaction will be greater.

2.2 Business development

Business development is a fundamental activity faced by all companies. The concept of business development is concerned with scanning the organization and its external environment in search for opportunities that will help to make the most of the current business and to develop it in the future (Tolis, 2005). The process of business development requires exploitation of multiple theories and practices, as well as utilization of organizational knowledge. In addition, it involves preparing employees for change of business processes, working routines, measurement metrics, or organizational focus, as well as prioritizing goals (Porras & Robertson, 1992). Business development is closely related to organizational development (OD) which aims at improving companies’ ability to perform, as well as employees’ psychological well-being, realization, and capabilities. OD needs to consider all the facts that can influence human behaviour in the work setting. Organizational change, which implies optimization of performance, is related to behavioural change of individuals within the organization. The on-the-job behaviour can be changed by manipulating aspects of the working environment. These aspects can be divided into four categories (Porras & Robertson, 1992):

- formal elements of the organization, which aim at coordination of employees’ behaviour (goals, strategies, administrative system, organizational structure);
- social elements (culture, interaction processes, informal patterns and networks);
- technology (tools, equipment, job design, work flow, technical systems);
- physical settings (space configuration);

The field of business development is closely related to Information Management, Process Management (PM), Benchmarking, Business Process Reengineering (BPR), Total Quality Management (TQM) (Farmer et al., 2001).

Information Systems (IS) and Information Technology (IT) are important for the development of today’s organizations. IS/IT are the means by which organizations satisfy business demands for information, develop new capabilities or competitive advantage (Tolis, 2005). Successful investment in infrastructure capable to support or change the business requires understanding of the current state of business and its designated direction (Shniederjans et al., 2004). Business development is concerned with a change. Irrespective to whether the change is planned, anticipated or emergent it will touch the whole activity system of an organization and reinforce changes in areas supposedly outside the scope of the change process (Orlikowski & Hofman, 1997).
Process orientation is recognized as a type of business development (Tolis, 2005). A process is “a network of activities that are repeated in time, whose objective is to create value to external or internal customers” (Bergman & Klefșjö, 2007, p.426). At the core of the concept of process orientation is the premise of dividing the work in several steps across organizational boundaries to address customers’ needs. Thus, process orientation helps companies to focus on the customer (external or internal) and achieve high quality of customer service (Lind & Goldhuhl, 2005). Internal customer service is a concept that asserts, “every department in an organization exists to serve someone, whether that will be the external customer or other department” (Farmer et al., 2001, p.350). This concept implies that organizations comprise of interrelated chains of individuals and functional units that consume inputs and transform them into outputs. Thus, here it is realized the importance of the process approach to quality undertaken by an organization. The main object of each individual or functional unit is to deliver the best possible service to the subsequent respective individual/-s or functional unit/-s (internal customer).

The term “internal customer” is important for organizations since in this way they can better understand the importance of quality of internal operations and thus quality of the internal service delivered to internal customers. Consequently, the organization following this process approach can realize their main objective, namely creation of cost – efficient operations without sacrificing quality (Farmer et al., 2001). High level of service quality is associated with more effective performance, lower waste, and lower cost, which in turn affects product quality and lead times. Improvements in internal service quality will in turn lead to improvements into quality delivered to the external customer (Hart, 1995; Heskett et al., 1994). Internal service quality is characterized by the attitudes that employees have toward one another and the way they serve each other (Marshall et al., 1998).

Farmer et al. (2001) state that the basic elements, incorporated within the internal customer service quality, are concepts of the process approach to quality and continuous improvements. Process improvement on continuous basis is best reached when each department treats those that they serve as customers. These are concepts that are promoted by TQM initiatives. TQM is a philosophy that combines various methodologies and tools that are to exceed customer expectation and at the same time to ensure the lowest possible cost. Therefore, it can be said that TQM realizes the relation between the internal service quality and employee satisfaction (internal customer satisfaction) (Marshall et al., 1998).

Prior to explanation of the main ideas associated with the TQM for achievement of internal service quality, it is necessary to explain the concept of internal customer satisfaction. Bergman and Klefșjö (2007) argue that there exist two ways in which the concept of internal customer satisfaction is possible to be considered. One way to elaborate on it is to think of an organization as a sequence of processes, in which the needs and requirements of every subsequent process, regarded as internal customer, need to be met. These thoughts are in line with the theory of Ishikawa who explains the concept as “meeting the needs of the next link in the chain” (Bergman & Klefșjö, 2007, p.342). The other way in which this concept can be thought of is more holistic. According to it, the best process and product results, and thereby successful organizational results can be achieved on the basis of satisfied employees who have positive opinion about the way in which work, working environment, and individual opportunities for development are organized. Hence, in the second way of thinking employees within the organization are internal customers whose actions reflect the quality of products.

TQM relies on several fundamental principles and values such as focus on processes, focus on customer (internal or external), continuous improvements; employees’ commitment,
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and decisions based on facts (Bergman & Klefsjö, 2007). Figure 2.2 depicts the TQM cornerstones and their relations.

![Figure 2.2 – The cornerstones of Total Quality Management (Source: Bergman & Klefsjö, 2007).](image)

The central cornerstone is a customer (internal or external), on which basis the other cornerstones are developed. Therefore, the quality issues are closely connected to customer requirements. However, focusing on customer includes not only understanding of customers’ needs, but also development of a service that is adapted to its needs (Bergman & Klefsjö, 2007). Delivery of high-quality products to external customers requires understanding and satisfying needs of internal customers within the business processes (Farmer et al., 2001). That is why, employees’ satisfaction with the tasks and work they perform within the organization is regarded as one critical factor that can affect results of the entire organization. Therefore, it is essential to consider all the employees as internal customers whose requirements need to be met. An important issue associated with the job satisfaction is motivation. It is said that employees can be motivated when their work encompasses three elements: creativity, physical activity, and sociality (Bergman & Klefsjö, 2007). Furthermore, the immediate feedback of employees’ work results and clearly communicated goals shared by everyone are two motivating factors. According to the theory of Herzberg individual "satisfiers" can be employees’ latitude and responsibilities, as well as involvement in teamwork, or participation in problem-solving. Porras and Robertson (1992) explain that the results of every employee are affected by the job design. Performed work is considered meaningful by employees when they can exercise control over the work, receive feedback, have learning opportunities, and interaction with other employees. Another incentive for successful performance is desire for achievement of better results which to a great extent is connected to continuous improvements, another cornerstone of the TQM.

The second cornerstone is focus on processes. The underlying notion of processes in the context of quality implies coordination between employees and their competences, that is, how the employees cooperate while performing their tasks. Consequently, the concept of process is concerned with teamwork and quality of its output. From the fore mentioned definition of process it is clear that a process has another property, namely the recurrence of activities. The repetitive element is important when the aim is improvement of a process. The purpose of every process within the organization is to meet the needs of its customer (internal or/and external) while utilizing the smallest possible amount of resources. The resources necessary for processes are for instance information, energy, material, or humans. A crucial task for the success of every process is identification of its (internal or external) suppliers and signals of what its needs are (Bergman & Klefsjö, 2007).
“Base decisions on facts” is a cornerstone that is of importance for development of the right product for the right customer at the right time. The following cornerstones - continuous improvements and let everybody be committed, are tightly interrelated (Bergman & Klefsjö, 2007). Continuous improvement value promotes the needs of constant improvements of quality of processes, methodologies which in turn will contribute to the production of high quality products while using fewer resources (Farmer et al., 2001 p.350). Likewise, Bergman and Klefsjö (2007) explain that continuous improvement is perceived as a valuable factor for the customer satisfaction by overcoming problems within the internal customer service such as: lack of information, difference in personal perceptions and understanding of information due to background, experience, reasoning, etc. The purpose of every internal service is to control and constantly strive to improve its processes. The quality of performed work is concerned with creation of environment in which all the employees are committed to continuous improvement of their way of work and achievement of customer satisfaction (Bergman & Klefsjö, 2007).

To reach internal customer satisfaction organization needs to start with deep understanding of the current state of processes. This implies not simply to ask internal customers about their needs but constantly evaluate of how outcome of one function influences work of its customers. In addition, Farmer et al. (2001) propose employee satisfaction surveys as a way of evaluation of the internal customer satisfaction. The internal customer satisfaction can be measured by sub-unit evaluation. This is a periodic evaluation for receiving accurate feedback from the internal customer. It is discussed the importance of the “customer report card” which include requirements for providing top quality service to the internal customers. Managers’ compensation can be related to their internal customers’ evaluations (Farmer et al., 2001).

Traditional techniques such as empowerment, training programs, teamwork, goal alignment, effective communication, are used for achieving the internal customer satisfaction (Farmer et al., 2001). Apart from the above mentioned techniques, achieving internal customer satisfaction is possible through cross-functional integration discussed in detail in Section 2.1.3. Likewise, Marshall et al. (1998) and Horovitz and Jurgens-Panak (1994) emphasize on positive relation between communication effectiveness and levels of internal service quality. Internal communication is a critical factor that can be used for obtaining employees commitment as to the quality of internal services. The communication implies organizing different improvement groups, and congress meetings where the importance of customer focus programs is explained (Horovitz & Jurgens-Panak, 1994).

Realization of internal customer needs requires not only giving account to the cross-functional processes but also managing them. This implies activities such as formal description of processes (process mapping, where the content and the relation between the different activities are outlined). Further, it is needed clarification of the actors responsible for a process, as well as assessment of the process in terms of goals fulfilment using diversified frame of measures e.g. productivity, quality, or delivery time. Process orientation can be reached only by taking full control over the processes, through reaching all previously mentioned activities (Tolis, 2005).

2.2.1 Business modelling

The importance of business modelling in today's world is growing fast. It helps organizations to cope with growth, globalization, and implications of emerging trends in the busi-
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ness. The widespread use of business modelling is facilitated by emergence of software based tools allowing organizations to analyze and simulate different facets of the business (Chaudhury et al., 2002). Business modelling is a discipline that helps companies to understand the current state of business. The core of business modelling consists of use of models to describe the business or some aspects of the business. Osterwalder et al. (2005, p.4) describe a business model as a "blueprint" that shows how the business is conducted within the organization. This blueprint incorporates strategic issues such as: positioning, or goals of the business, and therefore can be used in the process of planning structures and systems to realize organizational plans. Value of a business model can be examined not only from the organizational perspective of developing future strategies to pursue, but also from the perspective of individuals to help them comprehend the picture of the business, to find their place and role to play. Business modelling is particularly attractive from the perspective of managers, considering its consensus driven and participative approach. Consequently, business modelling is an inseparable component of business development (Tolis, 2005).

Over the years the process of business modelling was facilitated by appearing comprehensive set of techniques to ease the process of models creation often referred to as modelling languages. For the purpose of this study Enterprise Knowledge Development modelling technique will be used. Its construct, notation, and principles are described in the following Section 2.2.4.

2.2.2 The role of business modelling in business development

Osterwalder et al. (2005) identified several areas where business modelling can help in developing the business: understanding and sharing, analyzing, managing, and prospecting. The following areas are presented underneath.

- First area - understanding and sharing

Business modelling facilitates understanding and sharing of common picture of the business across the company. This is due to the nature of models as the output of modelling activities. Business models allow capturing and visualizing the current picture of the business, and therefore making it easier to communicate and share (Osterwalder et al., 2005). Using unified frame to represent different aspects of the business allows all actors to interpret the model in an unambiguous way, thus providing everybody with a single point of analysis (Lankhorst et al, 2005). Therefore, the understanding of the overall picture of the business is increasing. Consequently, the communication between employees from different organizational settings is facilitated, by providing them with universal frames to comprehend the business. In addition Osterwalder et al. (2005) argues that the limited scope of human capability to handle complex information can be significantly broadened by graphical representation of multifaceted phenomena. Lankhorst et al. (2005) is in line with this statement.

- Second area – analyzing

Business modelling is means by which the current situation in the company can be analyzed. Creating models can provide a frame of references to the past, as well as possibility to compare and analyze against models of competitors and companies in different industries. Osterwalder et al. (2005) argues that this can be a stimulus and inspiration for developing new innovative business models. It is important to remember however that in order to compare and analyze the models one needs a single viewing point on diverse phenom-
ena. Furthermore, business models created in the process of modelling help organizations develop measures to facilitate the choice, implementation, and control of future strategies.

- **Third area - managing**
The ability to analyze and understand organizational business practices facilitates the process of managing the organization. Deep understanding and common picture of the current business allows organization to be more reactive to changes in the external environment, as well as align distinct dimensions of the business such as business strategy, organizational strategy, and information strategy (Osterwalder et al., 2005). This alignment is one of critical success factors that can help the organization to gain competitive advantage, through coordination of business activities and directing organizational efforts. Formal description of various aspects of the organization helps to plan changes in different modules, assess their influence on other modules, and aid in the process of preparing the transition, change, and its implementation. According to Osterwalder et al. (2005) and Lankhorst et al. (2005) it is easier to cope with the change when it is understood by all members in the organization. This allows people to explicitly see the areas touched by the change and helps them adjust and assess the impact of change on their tasks.

- **Forth area - prospecting**
Business modelling assists in identifying new innovative prospects for the business. Formal description of all aspects and components of the business together with their mutual relationships allows to experiment with different combination of elements to find an optimum design. Broad portfolio of business models can reduce companies’ response to changes in the external environment and, thus increase chances of successful adaptation and survival. Therefore, it makes the organization less vulnerable to emergent changes. In addition models developed in the process of business modelling can serve as a tool to simulate and compare business models. Osterwalder et al. (2005) argues that even though the simulations cannot accurately reconstruct reality, it will help to cope with risk, reduce uncertainty, and thus make the company less exposed to the effects of change.

### 2.2.3 The role of business modelling in Information Systems development

Section 2.2 articulated close relation of the business development to the field of Information Management. Therefore, business modelling as one of the approaches to business development is not limited to facilitating development of companies business and frequently is employed to foster development and implementation of IS and IT. This sections deals with the potential use of business modelling in IS/IT development and implementation.

Lind and Goldkuhl (2001) see the role of business modelling as being indispensable to elicit the most important aspects of the business. This is because business modelling facilitates contextual understanding of the role of Information Systems to support the business, through creation of models (Lind & Goldkuhl, 2001). The model portfolio usually consists of a variety of representation techniques in order to broaden the understanding of the present situation and improve "communication between the participants in the design process" (Jacobs & Holten, 1995, p.96). Consequently, this will result in comprehensive description of the IS/IT to be developed or implemented, and thus increase fit of the system with the business. Maintaining only applications that add value to the company's products and services is a crucial factor determining success of a company.
Furthermore, business modelling can be used in the process of eliciting business requirements for the Information System to be developed. This is done mainly by facilitating the process of defining clear goals for the organization to pursue. A comprehensive definition of business goals will increase understanding of areas critical to success of an organization and facilitate choice of an appropriate IS/IT infrastructure and applications to support the designated business direction (Jacobs & Holten, 1995; Lankhorst et al, 2005). A clear definition of business requirements is essential from the perspective of IS personnel and systems developers to allow them grasp the expected functionality of the system. In addition business models can be used as a tool by IS personnel to explain how the intended investment in new IS/IT infrastructure will support and add value across the business. Thus as Tolis (2005) and Osterwalder et al. (2005, p.25) point out business models developed in the modelling process are a communication tool that allows to "capture, share and create" mutual understanding of the business across organizational structures and external partners. This in turn can lead to improved alignment between business strategy, organizational strategy and information strategy as described by Pearlson and Saunders (2010). The alignment is an essential factor contributing to organizational success, fruitful implementation of the IS/IT, as well as improved organizational performance, which were articulated in the work of Osterwalder et al. (2005).

Stirna and Persson (2007) argue that a common representation of the business and thus a shared understanding helps to fill the strategic gap between the present and expected organizational performance, by facilitating changes that will add value into organization business. It is important to remember that changes in one strategy will enforce need to change in other dimensions. Depicting business models can help to assess the level of change needed and its influence, through better appreciation of the current situation (Jacobs & Holten, 1995). According to Jacobs and Holten (1995, p.96) models are guides in changing organizational work practices, by helping develop "vague ideas: into "consistent specification" of the new work practice or Information System.

The influence of business modelling on performance was articulated by Osterwalder et al. (2005, p.30) who believe that performance of one's organization depends to a large extent on existence of the right "structures and capabilities" to successfully handle strategic decision making. Understanding of these factors is an important aspect that facilitates the process of planning of IS to support adaptation (Osterwalder et al., 2005). Moreover, deep understanding of the business model can help organizations to identified performance indicators to be used in the performance measurement system.

### 2.2.4 Overview of the EKD method

Enterprise Knowledge Development (EKD) is a modelling technique for visualizing and studying an enterprise and its components. This approach aims at representing and clarifying several issues such as: present state of the company; change needs; alternatives to cope with a problem situation, and evaluation methods for the alternatives (Barrios et al, 1999).

The EKD is used by companies (Bubenko et al., 2001) in two areas. The first area is concerned with development of the business, through fostering creation of new strategies, changing procedures and formulating requirements for information systems to support the business. The second area in turn concentrates on ensuring quality of business operations, allowing the employees to reach consensus, commit to the work, as well as share knowl-
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edge about the business. Both areas can enable better communication between stakeholders and promote organizational learning (Stirna & Persson, 2007).

The base of the EKD modelling technique consists of a set of description techniques, stakeholder participation, and a set of guidelines for working. Furthermore, the application of the EKD is facilitated by a set of software tools. The building blocks of the EKD technique are depicted below in Figure 2.3. Description techniques are concerned with a set of models used for representing the system to be analyzed or developed. Stakeholders are all the participants within the problem area that have direct or indirect interest in its outcome. The third component includes co-operative work and sharing of experience while developing the EKD models (Bubenko et al., 2001).

![Figure 2.3 – The EKD framework (Source: Bubenko et al., 2001, p.21).](image)

Output of the EKD technique is a meta-model comprised of five sub-models namely: Goal Model (GM); Business Rule Model (BRM); Concept Model (CM); Business Process Model (BPM) and Actors and Resource Model (ARM). These models in turn can be used to create Technical Components and Requirements Model (TCRM), which aims at eliciting, based on elements of the five above mentioned models and their relations, initial business requirements for an Information System to be developed. The dependencies between the above mentioned models are presented below in Figure 2.4. Further detailed description of the content of the five sub-models, their components, and driving questions for better understanding of the EKD models are incorporated in Table 2.4 presented in Attachment 2.

Figure 2.4 presented below points out high level of interdependencies between the above mentioned models. Furthermore, Bubenko et al. (2001) and Stirna and Persson (2007) advocate existence of links between components of these models. Therefore, the phenomena addressed in one sub-model should also be addressed in other models. For instance if a GM deals with issues concerning product development all the relevant concepts should be defined in the CM, and the respective process managing these concepts mapped in the BPM. Consequently there must be an actor responsible for the process which is depicted in the ARM. Goals and processes are governed by a set of rules expressed in the BPM, and so on. Needs analysis of respective processes, actors and goals can result in defining requirements for an Information System to support attainment of goals, business processes and actors within the organization. These links allow tracing organizational problems, motivat-
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ing their legitimacy, preparing, implementing, and controlling implementation of transition plans.

![Diagram of EKD meta-model](source)

The meta-model shown in Figure 2.4 was used by the authors to answer RQ1, RQ2 and RQ3. The choice of the EKD method to conduct analysis of the Case Company was stimulated by several factors. First of all understanding of the current state of business requires investigating several facets of the interface from differentiated points of view. The EKD is one of the few modelling techniques that, through incorporating into models different set of components, allows conducting observations of the problem area from different organizational aspects (Stirna & Persson, 2007). Second of all it is important to give account to existence of connections and dependencies between different components of the business. The EKD method acknowledges existence of connections between different models depicting different organizational aspects, as well as individual components of these models. Therefore, as Stirna and Persson (2007, p.2) advocate it allows - “tracing decisions, components and other aspects throughout the enterprise”. Third important aspect is flexibility of the EKD method, which allows substituting chosen models with different techniques which address the same issues. Consequently the EKD gives organizations possibility to adjust the modelling according to arisen needs or complement the view on the enterprise with different methods (Stirna & Persson, 2007). Last but not the least, the EKD is a modelling technique that incorporates the TCRM specifically designed to foster eliciting requirements or reengineering of Information Systems, therefore supports answering RQ3. There are many modelling techniques which facilitate the process of eliciting business requirements for an IS. Each technique however focuses on different aspects of the business, therefore resulting in different points of view on the enterprise. Thus, use of the EKD as a technique that employs different representation techniques to make the view of the enterprise as comprehensive as possible is desirable. This helps to improve users and developers understanding (Shena et al., 2003) and consequently leads to better alignment of the IS with the business. The authors are aware of other modelling techniques such as Unified Model-
ling Language (UML). The EKD was selected as favourable research method in this study due to the fact that it allowed the authors to cover the answer for all three research questions without unnecessary increasing the complexity of the research.

### 2.3 Information Systems

Information System is a "system of communication between people" (Beynon-Davies, 2009, p.2). Today the term Information System (IS) is associated with Information Technology (IT), and both concepts are sometimes mistakenly used interchangeably. Literature describes IT in relation to technology, namely: hardware, software, and networking designed to support Information Systems (Ward & Peppard, 2002). The above mentioned components allow connecting Information Systems through “voice mail, e-mail, voice conferencing, video conferencing, groupware and corporate intranets, phones, fax machines, personal digital assistants, and so on” (Dewett & Jones, 2001, p.314). It is important to note however, that existence of IS is irrespective to IT. Information Systems existed long before Information Technology ever appeared and consequently the IT can be seen as not indispensable part of Information System. Therefore, as Laudon and Laudon (2006) explained that information system can be computer based (computerized IS) or manual. The main role of IT is to support the core processes performed within the Information System.

Like every system IS is build upon mechanisms of gathering, processing, storing, distributing, and utilizing of information to make informed decisions and improve control over processes. The critical information needed to realize users’ needs, and the core of an Information System, is a result of three processes: “input, processing, and output” (Laudon & Laudon, 2007, p.15). In an organizational context the input consists of mechanisms that allow capturing raw data from the external environment of the company that is customers, competitors, regulatory bodies, suppliers, as well as the internal structures of the company. Subsequently the gathered raw data requires classification and interpretation in some meaningful context, realized with assistance of processing mechanisms. Obtained in such way information is delivered to all interested parties in the organization through output mechanisms. The recipient of the information can be either an employee or organizational process. Final element of IS mentioned by Laudon and Laudon (2007) is feedback mechanism, which aims at improving the output by means of adjusting the initial input stage. The model below adopted from Laudon and Laudon (2007) depicts the above mentioned transformation.

Figure 2.5 – Functions of an Information System (Source: Laudon & Laudon, 2007, p.15).
Depending on the clarity of rules stated for data gathering, storing, processing, sharing, and using the IS can be formal or informal (Laudon & Laudon, 2006):

- Formal IS – system in which the rules are structured and information flows clearly stated in terms of goals, strategies, and regulations from the management;
- Informal IS – system in which the rules are unstructured and tailored to the needs of employees to solve day to day problems, based on cooperation and knowledge sharing between employees.

The following sections describe very briefly the premise concerning the role of a formal computer based IS in the organization, as well as specific areas where the IS can contribute to optimization of the information flows and increase of internal customer satisfaction, referred to in the research questions (Section 1.5).

### 2.3.1 The role of Information Systems and Information Technology in the business

As noted by many researchers today’s business environment creates for companies’ not only enormous opportunities but also exposes them on a variety of pressures. Consequently organizations are forced to respond (Turban et al., 2008). In order to alleviate the threats created by the external environment and maximize chances of utilizing opportunities companies of all size invest in computer based IS and hope that this will help them reduce the response time and increase the quality of made decisions. Investments in IS/IT are an ongoing process (Orlikowski & Hofman, 2001). Which in time results in increased reliance of companies on IS/IT or even causes interdependencies between the ability to implement organizational strategy on functionality and capabilities of the IS (Laudon & Laudon, 2006; Curtis & Cobham, 2008). According to Laudon and Laudon (2007, p.8) “the kinds and quality of information systems” play a decisive factor for survival on the market and prosperity one’s organization. The widespread use of technology in the twenty-first century causes the IS and IT to become a critical resource necessary to run the business, one of the business fundaments as articulated by Pearlson and Sounders (2010).

According to Oz (2004) IS and IT has a strong role for creation of competitive advantage. There exist several initiatives used by companies to create competitive advantage that can be fostered by IS and IT. Some examples of initiatives include for instance (Oz, 2004):

- cost reduction, possible thanks to automation of business processes;
- raising barriers to enter the market for other companies, possible thanks to using restricted expertise, technology too expensive for others to implement or unavailable for competitors through patents and copy rights;
- creating unique products and services, allowing the company harvest the first mover advantage;
- differentiation of products and services, possible through emphasizing the superiority of a product or service over the competitors offer;
- enhancing products and services, possible through adding extra features to products and services;

As the author describes these initiatives usually are used in combination to create unique blend of strategies, which maximizes the chances of success on the market (Oz, 2004). Origins of several of these initiatives can be traced directly to the interface between the M&S
and PD department, where strategic decisions concerning products and services are made. Furthermore, the above mentioned initiatives for creating competitive advantage require large amount of information from external and internal environment of a company and its transfer throughout the organizational structures, which is facilitated by IS and IT. This information is inevitable ingredient of reducing and managing uncertainties connected with development of new products and services (Dewett & Jones, 2001). This argument is in line with statements presented in Section 2.1.1 (Bergman & Klefsjö, 2007).

According to Dewett and Jones (2001) this positive impact of computerized IS on organizations can be attributed to information efficiencies and information synergies. Information efficiencies are defined as savings in organizational resources such as time and money due to the supporting role of IS, which enable employees to perform better and faster hitherto existing work tasks. Consequently, the capability to collect and analyze vast amounts of data allows employees to undertake new responsibilities and roles within the organization (Dewett & Jones, 2001). Information synergies on the other hand are performance gains obtained “when IT allows two or more individuals or subunits to pool their resources and cooperate and collaborate across role or subunit boundaries” (Dewett & Jones, 2001, p.316). Information synergies are particularly attractive from the perspectives of studied interface between the M&S and PD department, through flexible adjustment and adaptation of actions taken in both departments to meet changing needs of involved actors.

2.3.2 IS/IT to improve information flow, internal customer satisfaction, and Companies responsiveness within the studied interface

As noted by Motivala and Thompson (2009) a single IS is not able to satisfy any company business needs, therefore there is a need for multiple systems. In order to reflect the needs of the interface between the M&S and PD departments several functions and types of computer based IS were investigated: systems focused on integration of processes, systems enabling collaboration between project teams, systems fostering decision making, and systems designated to capture and store organizational knowledge.

2.3.2.1 Integration of processes

Computerized IS are means by which organizations strive to integrate processes across functional units, and consequently to provide everybody in the organization access to up to date data. The flow of data in such systems is dynamic and immediate, which positively affects the accuracy of derived information, and therefore the quality of decision making (Motiwalla & Thompson, 2009). This argument responds to requirements for an effective decision making process specified in Section 2.1.3 (Massey & Kyriazis, 2006). According to Laudon and Laudon (2006) integration of processes is expected to minimize consumption of resources needed to perform work tasks, improve customer service, and collaboration between employees, and therefore make the organization more agile and productive. Consequently, alleviating conflicts arisen due to sharing of scarce organizational resources, and thus enhancing cross-functional collaboration described in Section 2.1.3 (Souder & Chakrabarti, 1978; Kahn, 1996). IS for integration of processes are frequently very broad in scope covering large parts of organization, thus comes the name Enterprise Systems (ES).

Figure 2.6 presented below developed by Laudon and Laudon (2007) depicts the span of various systems through all organizational levels and functions, as well as their ability to connect the organization with external environment.
The majority of investments in enterprise wide systems are made in the following types of systems: Enterprise Resource Planning (ERP), Supply Chain Management (SCM), Customer Relationship Management (CRM), and Knowledge Management (KM) (Chaffey & Wood, 2005). Table 2.5 presented below contains short description of role of each system.

It is important to mention however that decisions to implement enterprise wide system is not limited to the choice of one of the above mentioned system types. An alternative are Enterprise Application Integration (EAI) systems. Kroenke (2009, p.276) defines the EAI as “layers of software” that create a bridge for communication between distinct individual systems. Similarly to ES the EAI enables existing applications to share data, therefore providing integrated information to employees in different functional units across the organization, but gives the company greater flexibility in managing the application portfolio (Kroenke, 2009).

Table 2.5 – Enterprise Systems (Source: Laudon & Laudon, 2007; Motivalla & Thompson, 2009).

<table>
<thead>
<tr>
<th>Enterprise System type</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise Resource Planning (ERP)</td>
<td>ERP systems are systems “that support such enterprise functions as accounting, financial, marketing, and production requirements of organization” (Motivalla &amp; Thompson, 2009, p.8).</td>
</tr>
<tr>
<td>Supply Chain Management (SCM)</td>
<td>SCM are a gate connecting the company with suppliers and strategic partners “to optimize the planning, sourcing, manufacturing, and delivery of products and services.” by providing “information to help suppliers, purchasing firms, distributors, and logistics companies coordinate, schedule, and control business I processes for procurement, production, inventory management, and delivery of products and services.” (Laudon &amp; Laudon, 2007; p.360)</td>
</tr>
</tbody>
</table>
Theoretical Background

Customer Relationship Management (CRM)

“CRM systems focus on coordinating all of the business processes surrounding the firm’s interactions with its customers in sales, marketing, and service to optimize revenue, customer satisfaction, and customer retention.” (Laudon & Laudon, 2007; p.368)

Knowledge Management (KM)

“KM systems support processes for acquiring, storing, distributing, and applying knowledge, as well as processes for creating new knowledge and integrating it into the organization.” (Laudon & Laudon, 2007; p.436)

2.3.2.2 Collaboration enabler

Collaboration refers to work performed by two or more actors in pursuit of common goal. The main premise of collaboration is to achieve results greater than the sum of output of individual actors. This is done in the course of communication, coordination, and feedback given to actors by other participants of the process in a series of iterative steps. According to Kroenke (2009) there are three critical factors for effective collaboration:

• Communication – depends on interpersonal communication skills and constructive criticism, as well as capabilities of the IS
• Content management – ability of actors to influence and model the subject of collaboration to prevent conflicts
• Workflow control – pre-stated rules concerning how to create content, order of tasks and procedure, as well as how to handle rejected changes.

Product development process require great amount of communication, content management and workflow control between different actors and units in the organization in order to held fruitful results. IS and IT have great potential to facilitate the above mentioned critical factors.

Kroenke divided computerized IS into tools capable to support two types of communication namely “synchronous” (occurring when actors are participate in the communication in real time) and “asynchronous” (occurring when the actors do not communicate in real time) (2009, p.33). Table 2.6 presented below includes some example of available tools.

Table 2.6 – Tools and applications supporting synchronous and asynchronous communication (Source: Kroenke, 2009, p.34).

<table>
<thead>
<tr>
<th>Synchronous communication</th>
<th>Asynchronous communication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single location</strong></td>
<td><strong>Multiple locations</strong></td>
</tr>
<tr>
<td>Office applications such as PowerPoint</td>
<td>Conference calls</td>
</tr>
<tr>
<td>Invitation and attendance</td>
<td>Multiarty text chat</td>
</tr>
<tr>
<td></td>
<td>MS Groove</td>
</tr>
<tr>
<td></td>
<td>Videoconferencing</td>
</tr>
</tbody>
</table>

Content management as the ability to keep track on the subject of collaboration can be investigated considering the level of control one wants to achieve. Therefore Kroenke (2009, p.35) distinguish three levels of control available due to implementation of IS and IT, namely:
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**No control** – occurs when organization decides to use emails or file servers to manage content. Email although very simple tool to share content raises dangers of the recipient not receiving the message, not noticing or omitting to download the attachment. Furthermore sending the attachment to multiple recipients’ results in its multiple copies, and in case of updates, will result in many different versions of the attachment out of control. File servers however allow employees in organization to share common space to share documents, thus eliminating some of the emails’ drawbacks. Nonetheless typical file servers do not allow tracking version of the document. Consequently there can occur a situation when two or more employees work on a document in parallel being. Being not aware of changes made by others can lead to losses of content edited by co-workers. The version of a document updated by the last employee will be subject to future editions.

**Version management** – allows for tracing of changes to the document, as well as “features and functions to accommodate concurrent work”. Typical example systems allowing for document version tracking are wikis or applications such as MS Groove. Kroenke (2009, p.37) defines a wiki as “a shared knowledge base” created and managed by its users. Each update to the wiki is indexed and tracked by the system together with its author. Therefore it can help to control performance of respective users. MS Groove on the other hand is an application intended to facilitate creation of virtual workplace, and within it allow for file version management. Virtual workplace is a collection of tools, shared files and a group of users. MS Groove allows inter alia simple file management or managing users’ access to the virtual workplace depending on arisen needs. It allows editing one version of a file by multiple users. All the changes made in the document will be visible to other users until an editor makes final decision concerning revisions. The tools build in MS Groove allow both asynchronous and synchronous communication between users, through shared calendars, multiuser chat rooms and “Voice over IP” (VoIP) phone calls (Kroenke, 2009, p.39).

**Version control** – version control systems are an extension of version management systems. Kroenke (2009) to the most beneficial features of such systems classifies ability to limit actions taken by users and control the changes made to documents. Versions control systems allow creating virtual libraries of documents. If one user wants to work on a particular file, the document must be checkout. This way no other user will be able to edit it until the file is checked in the library again, therefore preventing potential conflicts. With connection with the above mentioned argument appears limitation concerning inability for the users to work simultaneously on one document. An example of version control system can be MS SharePoint. Except allowing document version control the system offers a variety of tools and functions to support web-based collaborative environment for example “surveys, discussion forums, wikis, member blogs, member Web sites and workflow” (Kroenke, 2009, p.41).

The last critical success factor for effective collaboration - workflow control - mentioned by Kroenke (2009) can be seen as extension of content management. IS and IT enable transition from a network of sequential tasks to tasks performed in parallel. IS/IT create a common workplace for the employees. Therefore, it is a mean by which managers can assign and execute workflows with their minimum involvement and maximum control over the progress. As a result it gives greater control over processes and at the same time provides time savings and increased labour productivity (Dewett & Jones, 2001). An example of application capable to manage workflows is the above mentioned MS SharePoint. It allows users to define the workflows accordingly to companies needs and enable automatic execution of processes.
Therefore, IS and IT links and enables employees within and across organizational units, which consequently leads to information efficiencies and synergies (Dewett & Jones, 2001). Moreover, it creates opportunities to create new innovative approaches to organize the workplace such as virtual teams or virtual organizations. The analysis of literature conducted by Dewett and Jones (2001) show clear dependency between tasks completion, problem solving or finding needed expertise and use of IS and IT. Furthermore, the IS and IT touches upon organizational cultures.

2.3.2.3 Knowledge management

In today’s competitive environment efficient utilization of organizational resources is insufficient to ensure forefront position of a company at the marketplace. Classic tangible organizational resources, in opposite to knowledge, can be easily copied by competitors (Laudon & Laudon, 2006). In turn companies rely on information and knowledge as the main driving factors to gain and sustain competitive advantage. Literature defines knowledge as a higher state of information, namely information enriched by personal experience, judgment and values (Pearlson & Saunders, 2006). The knowledge can be tacit (embedded in people) or explicit (codified and ready for reuse) and threefold categorized: know-what, know-how, and know-why. According to Pearlson and Saunders (2006) product development process is one of the most knowledge intensive activities run by organizations, which require knowledge concerning applicability of new technologies, current market trends, product physical design, as well as customer requirements. This view on product development corresponds to cross-functional approach described in Section 2.1.1. (Gupta, 1985; Hart et al., 1999; Bergman & Klefsjö, 2007; Urlich & Eppinger, 2008). Knowledge of individuals in the organization is a scarce resource that can be easily lost, therefore computerized IS were created to help codify volatile knowledge and utilize the full potential of collective that constitutes organization (Dewett & Jones, 2001).

Knowledge Management (KM) systems are enterprise wide systems designed to capture, store and enable access to all the relevant to companies’ operations knowledge from inside, as well as outside of the organization. Therefore as Dewett and Jones (2001) point out KM systems provide information efficiencies and synergies through facilitating the processes of searching, absorbing and applying past and current knowledge to solve organizational problems. There are many different types of KM systems which allow sharing knowledge across the organization in form of corporate documents, graphical presentations and models, repositories of information concerning employees with special areas of expertise, expert systems, intelligent agents, and so on (Oz, 2004).

Analysis of literature conducted by Dewett and Jones (2001) elicit various benefits of KM systems such as: facilitated decision making process, positive correlation in identification of problems, drawing conclusions concerning problems, conducting online discussions, and allowing for identification and communication with experts in certain area within the company. As mentioned earlier, product development process is a cross-functional activity that requires combined expertise (knowledge) of actors from different organizational units. Thus in case of week connections between units and social acquaintances employee working on a product development project may not know if the knowledge required to accomplish his/hers task even exists in the organization. Therefore computerized IS assist in finding previously unavailable source of expertise and relocating them according to arisen needs. Dewett and Jones (2001) among other benefits emphasize the role of IS and IT in eroding professional and personal boundaries of time and space, through allowing instant
access to a variety of previously unavailable information channels and increased employees participation in information networks. In addition KM helps to retain employees through recognition and reward of employee knowledge. Thus, IS are seen as means to overcome barriers concerning the cross-functional collaboration explained in detail in Section 2.1.3 (Parry & Song, 1993; Moenaert, 1994; Maltz et al., 2001). Last but not the least the role of KM systems in the product development process can be investigated from its potential influence on promoting innovativeness “by encouraging free flow of ideas” (Kroenke, 2009, p.352). As articulated in the synthesis of literature conducted by Dewett and Jones (2001) innovativeness refers to the ability to foster creating new solutions to reoccurring problems through information efficiencies, synergies and its creative use. Moreover, the dimension of innovation creation is fostered by the shift from linear to parallel processes, which allows actors in the process to interact during the whole process (Dewett & Jones, 2001). Consequently the unnecessary processes are subject to redundancies and the operations are streamlined (Kroenke, 2009).

From the above it becomes clear the role of Knowledge Management in contemporary organizations. KM strives to prevent loses of knowledge. It helps to share best practices across the organization and with partners, therefore preventing employees from “reinventing the wheel”, as well as facilitates acquisition of knowledge by employees (Pearlson & Saunders, 2006, p.323). Moreover, it leads to cross-functional synergies with ability to create competitive advantage through new products and services, decrease cycle times, and streamline processes (Dewett & Jones, 2001). Finally it helps to sense and respond to change (Pearlson & Saunders, 2006).

2.3.2.4 Decision support

As noted in Section 2.1.1 the PD process involves participation of cross-functional teams and individuals from different organizational levels, which face a variety of decisions during the project lifecycle. These decisions should be accurate and undertaken in a timely manner in order to deliver the products fast and in accordance to customer expectations. Rapid advances in technology allow for real time transfer of information, and therefore reduce barriers in the decision making process such as limited, delayed or inaccurate information (Laudon & Laudon, 2006). Consequently the organizations are able to reduce the level of experts needed in certain fields, reduce the levels of inventory, and in turn the storage space. The above mentioned abilities of IS and IT to facilitate integration of organizational business processes, fostering collaboration and knowledge management across the organization contribute to improvements in the decision making process.

There is a variety of computerized IS to support decisions across organizations. These systems usually are divided considering different needs of managers and employees on different organizational levels. Therefore one can distinguish between systems design to support strategic decisions of top managers, tactical decisions of middle managers and project teams, as well as decisions of operational management, project teams, and individual employees (Laudon & Laudon 2006). Each of the above mentioned groups faces different types of decisions. More detailed discussion of information requirements, decision types, and IS designed to support decisions of the key groups is presented underneath.

Top managers are usually faced with unstructured problems, which are defined as problems that cannot be solved using an algorithm (a single set of steps always leading to the same results) to reach optimal solution (Oz, 2004). They concern long term strategic decisions and require general real time information coming from both inside the company and the
external world (Laudon & Laudon, 2006). Executive Support Systems (ESS) are a typical type of systems designed to facilitate the process of strategic decision making by top managers. These systems aim at articulating and addressing answers to strategic questions. According to Laudon and Laudon (2006) the functions of an ESS are monitoring of organizational performance, identification of potential problems, opportunities that the organization might take advantage of, as well as tracing moves of competitors. A very important characteristic of an ESS’s includes the possibility to adjust the number of monitored indicators and their display style according to current needs of the management in order to prevent overload with data, and if needed to drill down through the data to find potential sources of encountered problems to specific geographic area, product, time, etc. (Oz, 2004). As mentioned earlier the input for ESS comes from both internal and external sources. Internal sources include all systems at the disposal of employees within the company to provide executives with a comprehensive picture of the current performance. External input comes from online sources of market stock exchange, industry analysis and standards, competitors strategic moves and so on (Laudon & Laudon, 2006).

Middle managers and project teams usually are concerned with semi-structured problems. Oz (2004) defines semi-structured problems as problems that cannot be unambiguously categorized as structured or unstructured. These problems require access to specific, focused, real time information in order to ensure optimal allocation of resources to reach strategies set by top managers. Management Information Systems (MIS), Decision Support Systems (DSS), and Group Decision Support Systems (GDSS) are typical types of systems designed to support decisions of middle managers and project teams. MIS and DSS are systems designed to streamline decisions made by individuals within the organizations (Oz, 2004). However as Laudon and Laudon (2006) explained both systems are concerned with solving different types of problems and therefore focus on distinct indicators. Whereas DSS focus on structured problems and provides reports of routine flows to show overall performance of the organization, MIS are concerned mostly with semi-structured and unstructured problems (similarly to ESS), and are concerned with “change, flexibility and rapid response” (Laudon & Laudon, 2006). On the other hand GDSS support decisions to unstructured problems that require participation of multiple actors. Oz (2004) emphasizes the role of GDSS in context of idea generation, prioritization, and selection. Therefore GDSS can be seen as a bridge that enables collaboration of employees in the decision making process. Consequently, one can compare them with Groupware described shortly in the previous section. Nonetheless Laudon and Laudon (2006) differentiate between these two types of system. According to the authors the role of GDSS is not limited only to facilitating communication but thanks to implementation of various tools enables to undertake consensus driven decisions. Some examples of these tools include electronic questionnaires, brainstorming tools, idea organizers, voting mechanisms, group dictionaries, stakeholder identification, or policy formation tools (Laudon & Laudon, 2006).

Operational managers, project teams, and individuals in organizations usually face structured problems, which are defined as problems that can be solved using an algorithm (Oz, 2004). These problems are concerned with short term operational performance and in turn require real time information concerning day to day performance of organizational units, often narrowed down to specific areas and very detailed (Laudon & Laudon, 2006). Systems designed to support decisions of operational managers, project teams, as well as individual employees are the same as for the previous category of middle management and project teams Management Information Systems (MIS), Decision Support Systems (DSS), and Group Decision Support Systems (GDSS). Applications and functionality of these systems overlaps with the previous paragraph, therefore it won’t be subject to further discussion.
3 METHODOLOGY

This chapter introduces the reader into scientific classification of this study. Furthermore, the employed methods are presented and their choice justified. The chapter is structured as follows: at the beginning the nature of this research is described; second of all brief theoretical explanations of appropriate for the purpose of this study research method and techniques are interwoven within the approach employed to answer the research questions.

3.1 The nature of the research

According to the classification by the nature of the research and contribution to the knowledge presented by Sharp et al. (2002, p.16) an investigation where an output of the researchers’ work is recommendations for actions taken by others is called “applied research”. Based on the purpose specified in Section 1.3, description of a company problem, as well as reviewing existing knowledge in the state of art, the authors argue that the nature of this thesis can be categorized as applied research. According to Williamson (2002) applied research is the most appropriate for information and business environments. Furthermore, this type of research is not limited only to practical problem solving but also generates new theories and contributes to development of the field of science.

The context of this thesis is the interface between two departments: Marketing and Sales (M&S) and Product Development (PD). This interface is characterized by a complex environment that is comprised of human actors, technical resources used for information processing and transmission, information itself, as well as their interactions with each other. Answering the research questions requires a holistic picture to look at the work setting under study. From this consideration it is clear that the authors employed a system view regarding the problem situation.

The authors of the thesis argue that answering of the RQs specified in Section 1.5 requires understanding of existing reasoning styles. The authors emphasize on the fact that this research is carried out in an iterative way where inductive, deductive, and abductive styles of reasoning are used. At the beginning of the research deductive style of reasoning is applied since concepts from different literature fields are used to define the problem area and to gain better understanding of the interface (Williamson, 2002). Identification of the change needs is based both on the literature in the field of Process Management, Information Dissemination, Cross-functional Communication and Functional Integration and the results obtained in the study of the Case Company. In this case the authors argue that the research is associated with an abductive style of reasoning (Onwuegbuzie & Leech, 2006). Abduction is a concept concentrated on “uncovering and relying on the best of a set of explanations for understanding one’s results” (Onwuegbuzie & Leech, 2006, p. 474). Conclusions drawn from an individual case can be generalized and useful in other cases. At this point the reasoning applied in the research can be regarded as inductive.

It is appropriate, to fulfil the objectives of this thesis, to apply qualitative approach of the research. According to Miles and Huberman (1994) qualitative data popularity is growing in the fields of organizational and business studies. This is due to the merit that qualitative data allows “well grounded, rich descriptions and explanations of processes” (Miles & Huberman, 1994, p.1). Likewise Dubé and Paré (2003) explain that qualitative research is appropriate for study Information System and Information Technology phenomena. As the authors further explain it enables researches to trace the events, see clearly their conse-
Qualitative research methods are especially useful when investigating a particular case, real life problem, in its natural setting and context. These methods allow the researcher to take a “holistic view on phenomenon and to reveal its complexity” (Miles & Huberman, 1994, p.10). The findings in a qualitative research “are not arrived at statistical methods or any other procedures of quantification” (Ghauri & Gronhaug, 2005, p.109). There are many ways in which a qualitative research can be carried out. It is said that qualitative methods best fit for exploratory research. Exploratory research is valuable for the theory building and use qualitative methods such as case study among others (Williamson, 2002). This thesis is exploratory research since it is aimed at defining “questions, constructs, propositions, or hypotheses” (Dubé & Paré, 2001, p.11). More specifically, the research purpose of this thesis suggests change needs (RQ2) and initial business requirements for an Information System to be developed at the Case Company (RQ3).

3.2 Applied research methods

This section deals with research methods employed in this study. Depending on the form of the research questions “what” and “how” specified in Section 1.5, the favourable research methods are:

- Literature review

Study of the literature is necessary since it supports researchers in understanding the problem and its context (Williamson, 2002). The literature review helps in investigating relationships between concepts and identification of problem areas. The literature reviewed for the purpose of this study was in the field of Product Development Management, Process Development and Management, Total Quality Management, Business Development, Business Modelling and Information Systems Management.

This method directed the authors and gave opportunities for the obtained results to be generalised. This is due to the fact that the literature review allows comparison between the empirical results and existing theory. In addition, the literature review in the field of Research Methodology assists in choice of appropriate research methods and techniques (Leedy & Ormrod, 2005).

The theoretical investigation was conducted mainly based on the literature available in the database at the Jönköping University Library. Textbooks helped authors to gain fundamental knowledge in the scientific fields under study. The focus was mainly on books, conference papers, and journals since through analysis of these sources authors were able to obtain both general and detailed information about a certain problem. This is supported by Sharp et al. (2002) and Leedy and Ormrod (2005).

- Case study

According to Ghauri & Gronhaug (2005) a case study is the most suitable method to apply when the investigated phenomenon requires insights from its direct environment, and when there are problems with quantifying concepts and variables. Case study is a favourable method for studying a single organization or organizational units. In the light of this
thesis the studied phenomenon is a unique event touching upon specific organizational setting (Dubé & Paré, 2001), thus the case study research method was desirable to conduct the analysis. Employing case study as a research method suggested using semi-structured interviews and observations as primary data collection techniques (Yin, 2003; Williamson, 2002). Furthermore, Dubé and Paré (2003) explain that the case study in comparison to other qualitative methods (ethnography, action research, grounded theory) requires less time to be spent on the investigated field.

Considering the three basic characteristics of this thesis one can have a justifiable rationale that the research strategy used in this thesis is a case study (Yin, 2003). These characteristics are as follows:

• the RQs are of how and what type; It is argued that RQs of “what” type are frequently used in case of exploratory case research (Dubé & Paré, 2001);
• the investigators do not have any control over the behavioural events;
• the study focuses on temporary events.

Empirical data collected for the purpose of this thesis was based on a single case design. Dubé and Paré (2003) explain that that the choice between a single- and multiple- case design is dependent on circumstances. The choice of a single case design strategy can be motivated by the following arguments. The interface between the M&S and PD departments at the Case Company is seen as unique and meet conditions that allow theory testing or building (Yin, 2003). Eisenhardt and Graebner (2007) explain that single-case design strategy is characterized with richness of the phenomenon description and details. This is in line with Dubé and Paré (2003, p. 598) who argue that a case study is useful when “holistic in-depth investigation is needed”.

Another reason that justifies the choice of research is that this thesis tries to cast a light on decisions, and more specifically why these decisions are appropriate and what will be the possible result. Further, unique characteristic of a case study is its ability to manage great amount of evidence such as documents, observations, and interviews (Yin, 2003).

The most difficult part in relation to the choice of a case study is the fact that findings and conclusions can be easily directed by biased views. That is why this research strategy requires a high level of rigour. Another concern associated with a case study is a possibility to generalise based on one single case. According to Yin (2003, p.10) “case study does not represent a “sample”, and in doing a case study, your goal will be to expand and generalize theories (analytic generalization) and not to enumerate frequencies (statistical generalization)”.

According to Yin (2003) identification of the unit of analysis as an element of a case study design is seen as a critical area. The unit of analysis is highly connected to the RQs and problem areas that are discussed within the research. Williamson (2002) is in line with this argument and adds that generalization of obtained results is also associated with the unit of analysis, meaning that the results can be applied for other organizations, processes, events, or individuals.

To summarize the interface between the M&S and PD departments is associated with high degree of uncertainties and complexity. Further, the authors do not have control over the context of the considered phenomenon. Therefore, a case study gives opportunities to investigate different variables and their relations to each other, as well as to describe processes in their context (Williamson, 2002). Case study as a basic method applied in this re-
search provided the authors with a structured way for understanding the studied interface and subsequently reduced the complexity of the working environment, as well as helped to identify problem areas. Furthermore, the case study is an appropriate method for theory building (Eisenhardt & Graebner, 2007).

### 3.3 Research design

It was argued in the Section 3.2 that one appropriate method for finding answers to specified research questions is the case study. This argument is justified by the fact that the RQs (Section 1.5) are “what” and “how” (Yin, 2003). Thus, in order for the case study to be successfully carried out there is a need to follow a structured approach - research design (Williamson, 2002).

#### 3.3.1 Selection of the case company and the unit of analysis

The case study was carried out in a traditional Swedish manufacturing company, which aims at increasing their market share globally. The company realized a need for better integration and communication between the M&S and PD departments, motivated by ever-changing customer demands and increased competition. Moreover, the Case Company struggles to extract the information from company’s branches located in 17 countries and use it to improve the work of the studied interface.

The company was selected since it incorporated into their production newly developed technologies and at the same time focused on customer requirements. Thus the Case Company production is highly customized. As stated in the organizational strategy incorporating new technologies and meeting customer demands requires rapid response to the changing environment. Consequently, the company’s environment is complex and influenced by many interrelated variables which affect the quality of final products.

The purpose of this thesis is to enhance understanding of the cross-functional integration. The interface between the M&S and PD was an appropriate setting for analysis since this is a place where the success of the entire company is decided. Figure 3.1 presented underneath depicts the unit of analysis. A robust integration within the interface is recognized as a prerequisite for a rapid and accurate response to market fluctuations. Further, the studied interface is of interest, as the company perceives the need for better inter-departmental communication and information sharing.

![Figure 3.1 – The unit of analysis (displayed with dotted line).](image)
Based on the unit of analysis the research strategy and research questions were formulated (Yin, 2003). The analysis tried to understand the fit between the actual information provided by the marketing function and the information needed to accurately support fulfillment of the different activities performed during the product development stages. The unit of analysis chosen implies that activities that are performed outside the system boundaries were not considered.

### 3.3.2 Basic Approach and Steps

As mentioned in Section 3.1.1 M&S and PD departments were at the core of authors analyses. Firstly, efforts were put to understand and identify the goals, current processes, actors, and resources managed within the studied interface. Understanding the present situation helped the authors to answer the RQ1 stated in Section 1.5. Analysis of the current situation was conducted with the assistance of the Enterprise Knowledge Development (EKD) method. The input necessary for analysis was gathered through interviews, observations, internal and external secondary data.

By analyzing the gathered information the authors proposed a number of change needs necessary to optimize the current Information System, and thus to ensure that the right information, at the right time and for the right person is available in order to improve the internal customer satisfaction at the Case Company. Consequently, the RQ2 was answered.

The next activity involved defining the initial vital functionality of a computer based Information System that is necessary for better integration of the M&S and PD departments. The aforementioned initial business requirements contain specific directives for the Case Company considering realization of companies’ goals. In this way the authors answered RQ3 specified in section 1.5.

The results obtained from the empirical research allowed deep understanding and explanation of the topic of interest which can be “valuable in other settings as interpretations of phenomena but which are not wholly predictive for future situations” (Williamson, 2002, p.116).

### 3.3.3 Collection of empirical data

The empirical investigation at the Case Company was conducted from February to June 2010. The first meeting was held at the beginning of February with Chief Information Officer (CIO) from the Case Company. The subject of the meeting was discussion of the proposal for the master thesis. During the meeting a brief company presentation was given, as well as the authors introduced the company representative to their subjects of interest. The choice of the thesis scope was directed by the degree of importance of the discussed problems for the Case Company.

In the course of the following week the authors were clarifying the problem area. In meantime the Case Company was collecting information necessary for launching the investigation. Prior to first visit to the Case Company the authors reviewed background information about the company. The information was primary obtained from the company website, as well as materials delivered by the company representative. The first company visit was held on 23th of February with the CIO at the Case Company. The primary aim of this visit was for the students to get familiar with the working environment with special focus put on the
unit of analysis. The company tour included IT department, Product Development department, Marketing and Sales department, as well as the factory. The authors got acquainted with the structure and location of the above mentioned departments. During this visit the scope of the project was discussed, as well as techniques that could be used for data gathering revised. In addition, the research questions were approved by the CIO at the Case Company. Visits to the Case Company allowed the authors to conduct observations of the unit of analysis in its natural setting.

According to Ghauri and Gronhaug (2005, p.120) observation are a technique that involves "watching and listening of subjects of interest in their natural setting in a way that enables learning and analytical interpretation". The main purpose of observations was to supplement other types of data gathering. It can be said that in this thesis observations had more subsidiary role. Observations emphasized on employees in both departments in their natural setting to gain better insights about the communication process under study. Objectivity and accuracy was among the driving reasons for employing this method for the purpose of this thesis.

During the following three weeks a pre-study was conducted. The aim of the pre-study was for the authors to obtain a holistic picture of the processes and deeper understanding of the information flows between the M&S and PD departments. This time was devoted to conducting unstructured interviews and observations. Unstructured interviews were conducted with the CIO at the Case Company. The main focus of this interviews was on the explanations concerning the complexity of the IS, IS/IT architecture, and organization of work at the Case Company. Interviews are a technique for data gathering that provides high quality information thanks to direct interaction between the researchers and respondents (Ghauri & Gronhaug, 2005). Interviews are appropriate for obtaining a realistic picture of the way in which people perceive a particular subject.

At the same time a literature review assisted authors in structuring the problem area and the collection of the data. The authors were provided with a great amount of internal secondary data, that is to say company documents and presentations that helped to understand the company vision, goals, and policy.

Meetings with the supervisors of the thesis took place during the whole period of collecting and analyzing data. These meetings played a role of milestones and aimed at ensuring the correct direction of the development of this thesis.

On the 19th of March three semi-structured interviews were conducted. The interviews with every respondent were carried out independently from each other in order to avoid any influences on their opinion. The interviews were held in the following order: the Director of the M&S department; the Director of the PD department; and the Marketing Support Manager. The interviewees were selected with assistance of the CIO who had knowledge about the organizational structure and employees’ responsibilities. The interview respondents are three key persons that are concerned with the results of the thesis and had a holistic view of the integration and communication channels under investigation. Due to the long experience of the interviewees in the company the participants believed that they had deep knowledge on the topic of interest. Each interview lasted one and a half hour and the schedule of topics included in the interviews was sent in advance to the CIO at the Case Company. Moreover, the role of the CIO was consultative. The CIO guided the authors through the development of the whole research and assisted in clarifying concepts. That is why the authors developed unstructured interviews depending on the particular problem area.
These interviews delivered valuable input for answering the RQ1: identification of the current state of integration between the M&S and PD department. The primary objective of the conducted three interviews was gathering of data which facilitated the authors in understanding the Case Company working environment and developing models. The interviews aimed at: recognition of the goals of both departments; the problems and opportunities that respectively hinder or support the goals; isolation of departmental concepts; outline of the main process and actors within the departments under study; as well as identification of the rules guide the performance within the departments. In relation to the above mentioned arguments the three interviews were grouped into different sections. The first two interviews consisted of six sections: goals, rules, actors, processes, communication, and others; and the questions in the third interview were divided into three sections: general information, goals, communication. The structure and the content of questions in the first two interviews were similar. This is due to the fact that the interviewees were at the same level of hierarchy at the Case Company; they were both Directors of departments (the Director of the M&S department; the Director of the PD department). The main aim of these interviews was to obtain overall picture of the studied interface. The third interview consisted of questions which were to some extend different from the questions of the first two interviews. The reason for the difference is that the aim of the third interview was to gain more detailed picture of the interface problems at a lower hierarchy level. The authors tried to gain more insights about the integration and information flows within the studied interface from a person who held a position which realized direct connection between the M&S and the PD departments. Moreover, the Marketing Support Manager was in a position with intensive communication channels between the investigated departments.

On the 26th of April the authors of the thesis confirmed the models developed and the results obtained during the interviews with the two of the interviewees, the Director of the M&S department, as well as with the Director of the PD department. In addition, the developed models and the accuracy of the results obtained through the interviews, observation and documents were confirmed by the CIO at the Case Company.

Moreover the authors were provided with data such as mission statements; company presentations; procedural instructions; reports were partly provided during the unstructured interviews with the CIO at the Case Company and also sent by emails. According to Ghauri and Gronhaug (2005) this type of data can be classified as internal secondary data. Internal secondary data is defined as a data that originates directly from the environment under researchers investigation. During the first interview the Director of the M&S department provided the researchers with valuable information such as quality standards and organizational structure of the M&S department. During the second interview the Director of the PD department introduced the authors with quality certificates, CCPS procedures, organizational structure of the PD department, as well as job description within the department. During the third interview the Marketing Support Manager placed a working chart and organizational documents at the interviewers’ disposal. The internal data benefited the authors involved in investigation in several ways. At the beginning it was important to mention the enormous time savings thanks to readily available information concerning the investigated departments. It allowed the authors to deepen the knowledge about the problem domain. It also helped the authors to choose suitable methods for gathering complementary primary data. The list of obtained documents is presented in References under section internal secondary data. The content of the documents was not attached due to confidentiality of the data.


3.3.4 Collection of theoretical data

For the purposes of this study besides internal secondary data the authors utilized external published data sources, as well as some commercial sources. External secondary data is a data that originates from sources different than the environmental setting under investigation (Ghauri & Gronhaug, 2005).

The literature was chosen in conjunction with the development of the research questions. Owing to this fact the formulation of the problem area and the research questions were influenced by different perspectives presented in other researches. Comprehensive literature review allowed the authors to gain better insights of the existing research within the studied area, as well as to position the ongoing thesis within the context of the investigated theory. The approach applied for the purpose of this thesis concerning the literature choice and categorization is based on three perspectives: Engineering perspective; Management perspective; and Information Systems perspective. The engineering perspective covers literature in the field of Process Management and Quality theories.

Having conducted the literature review in the engineering field it was identified that there was a great amount of research undertaken on the topic of interest. The most difficult part during the literature review was that the theory covered broad perspective of the problem area. There was a great body of literature concerning issues such as the role of marketing function within the product development processes, the coordination and communication in M&S and PD department, and so on. Furthermore, it can be stated that there was quite a lot literature in the field of Process Management such as TQM, process control tools; as well as in the field of Quality issues such as inter-organizational customer satisfaction. However, the authors argue that the theory did not provide a clear picture on relations that exists between these three literature fields: M&S and PD interface, internal customer satisfaction, and process control. In addition it can be said that there were few papers concerning the topic of interest which were unstructured.

The Management perspective covered literature in the field of Change Management. The investigation revealed abundance of approaches and techniques that could be used for the purposes of this study. The researchers however decided to include only theories relevant to Business Modelling, as a mediator between understanding the current situation and defining the desirable change needs, as well as facilitator in defining the initial requirements for an Information System to be developed. The choice of theories was limited to literature that was perceived as useful and beneficial to assist in answering of research questions.

The Information Systems perspective covered basic literature in the field of Information Systems and Management Information Systems. The primary sources of data were up-to-date books, which gave overview of different applications of Information Systems. Special focus was put on a supportive role of a computer based Information System. This literature allowed the authors to elicit four areas, where the IS can help in improving the integration and performance of the M&S and PD interface. There was a great body of literature applicable to the studied field, however it was difficult to univocally categorize it due to high level of interrelations between concepts.

3.3.5 Data analyzes

The analysis strategy adopted for dealing with the vast variety of data collected was the Enterprise Knowledge Development (EKD) method. The method is explained in-depth
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within the theory of Business Modelling and more specifically Section 2.2.4. The strategy
for analysis provided the research with answers concerning what and why to analyze, as
well as justified the data collection activities. In the course of analysis different EKD mod-
els were developed: Goals Model (GM), Business Processes Model (BPM), Actors and Re-
sources Model (ARM), and Business Rules Model (BRM), Concepts Model (CM). Further,
the analysis was supported by the cornerstones of TQM theories explained in details in
Section 2.2. The authors state that one of the TQM cornerstones, namely “Base decisions
on facts”, was used throughout the whole research. The development of all models was
based on facts obtained during interviews and documents. In addition, it can be said that
the cornerstone - “Committed leadership” was used since the interviews were conducted
with three Directors of departments and one Manager. Moreover, the whole research
aimed at enhancing the integration of two departments and quality of performed work,
which subsequently will increase the customer satisfaction. This statement is highly related
to the one of the TQM cornerstones – “Continuous improvements”.

The development of the GM is initial step of any modelling activity. Therefore, the authors
concentrated on this aspect during the preliminary stages of the project. The goals model
contains rational for a choice of components selected in other sub-models. Regarding the
cornerstone – “Let everybody be committed” the authors perceived it as a weakness of this
research and it is explained in details in Section 6.1.

The BPM focuses on business processes within the M&S and PD interface. The model as-
sisted in understanding the relations between departments and sequences of tasks com-
pleted by the M&S and PD personnel. The model provides the reader with a clear picture
of functioning of processes within the studied interface. Focus on processes is one of the
TQM cornerstones. TQM philosophy promotes process orientation approach to enhance
the quality of internal customer services within an organization.

In order to identify actors and resources analysis of the departmental structures were con-
ducted in accordance to documents delivered by the Case Company and a list of resources
and actors was elicited. The ARM was developed simultaneously with the BPM, which with
conjunction with the GM delivered all the components necessary to finalize the model.
Customer focus is the central cornerstones of TQM. This philosophy allows the authors to
regard employees as internal customers whose requirements need to be met.

Creation of the BRM was guided by the GM. This is due to the fact that close relation of
those two models required presenting the rules along with goals. Depicted rules limit and/
or facilitate achievement of goals. The model is based on delivered documentation, as well
as conducted interviews.

A number of statements in the above mentioned models required further clarification
therefore the CM was created. It depicts the important concepts included in the GM, as
well as information and material sets in the BPM. The interface between M&S and PD de-
partments is characterized by a relatively simple to comprehend environment, therefore
this model plays as subsidiary role.

In turn, in depth investigation of the GM, BPM, BRM, ARM and CM allowed creating the
Technical Components and Requirements Model (TCRM), which defines initial business
requirements for the Information System.
3.3.6 Data triangulation

Triangulation is a “process of combining multiple data sources” (Dubé and Paré, 2001, p. 21). Data triangulation is an important strategy for enhancing rigour. The methods triangulation is when the data is collected through several methods. For the purpose of this thesis all methods for data collection are qualitative, namely semi-structured interviews and observation, as well as document studies. This strategy is important for confirmation of consistency of the findings (Williamson, 2002). By using different methods the authors have opportunity to compare the consistency of the obtained facts. Sources triangulation is a way for cross-checking of the data consistency. This is data that is obtained from different people. In this thesis interviews were conducted with the directors of the M&S, PD departments, CIO, as well as an employee from another hierarchy level, namely the Marketing Support Manager. The authors of this thesis believe that the problem area can be better understood when different perspectives are gathered and subsequently analyzed. Further, the authors believe that the drawn conclusions are more reliable if the data collection methods and resources are more than one. This is in line with Dubé and Paré (2001).

3.3.7 Validation and reliability

Due to the fact that the investigation is conducted by two participants the degree of bias during the data collection and interpretation of events, documents, interviews was diminished. Moreover, the background of the authors is in two different fields, Information Management and Production Management and Development, which allowed to consider the problem from different perspectives and also to compare different points of view. Consequently, the degree of research validity will be higher (Williamson, 2002).

There exist two types of validity – internal and external. Internal validity refers to design of the research and sufficiency of data collected for drawing conclusions. External validity on the other hand is concerned with a question of whether the drawn conclusions can be generalized or not, in the context of this thesis to other companies (Ghauri & Gronhaug, 2005, p.65).

The authors of the thesis believe that all the components of the case study are included in this paper and the amount of data is sufficient to answer the RQs specified in Section 1.5. The documents provided by the company were used first to gain better understanding of the problem in the context of the Case Company and to develop the questions incorporated in the interviews. Since the data gathered through the interviews was insufficient for development of the business models, the provided documents during the interviews were useful to add the missing data. Further, the internal validity was enhanced by using consultative approach (with assistance of the CIO) to develop the models. Consequently, the authors believe that the used methods for gathering and analysing data are appropriate. Thus, the obtained results can be generalised due to specific characteristics of the Case Company (Section 3.2).

Graziano et al. (2004) explain reliability as a concept that implies that same results of the study should be obtained regardless who performs measurements and gathers the data. It is said that high reliability when qualitative methods are used is hard to be reached. However, the authors can guarantee that they followed precisely the instructions for carrying out interviews and the questions included within the interviews were properly selected. The accuracy of the questions can be justified with the fact that authors used to a certain extent the
questions proposed in the EKD manual (Attachment 2). The credibility of the research is confirmed by the collaborative assessment of the developed models and the analyses of the data obtained during the interviews and documents (Dubre & Pare, 2003). In this case, the credibility of the research was attained by confirmation of the obtained results by the two Directors of the M&S and PD departments, as well as the CIO.
4 Empirical findings

This chapter presents the results of semi-structured interviews conducted with the interested parties within the studied interface. The results are based on the answers to the interview questions presented in Attachment 1. The gathered data was to some extent rephrased and reduced since many answers covered the same area.

4.1 Results obtained during the interview with the Director of the Marketing and Sales department

On the first group of questions concerning the goals of the Marketing and Sales (M&S) department at the Case Company the interviewee explained that this organizational unit is mainly responsible for preparing the market for incoming new lines of products. The strategy is focused on branding, which involves maintaining various brands on different markets. In order for the brands and products to be successful, however, the Director of the M&S department emphasized the need for close cooperation and integration with the Product Development (PD) department.

The goals of this unit are hard financial goals, attainment of which is governed by a set of measurable indicators. The interviewee provided an example that is, increasing the turnover by 20% in the next year. Moreover, the attainment of organizational strategy is measured by the relative market share in different regions where the company operates.

The strengths and at the same time opportunities for the company according to the Director of the M&S department are seen in companies’ experience on the market and values developed during years of operations such as quality, honesty, as well as compromise between technology push and market pull approaches. The main challenge is creating energy efficient products that will meet the strictest norms for the benefit of customers and ensuring high quality by extending products life cycle.

In relation to the second group of questions concerning existing rules and standards within the department the Director of the M&S department explained that the Case Company operates according to quality standards ISO 9000 and ISO 14000. Further, the interviewee explained that the work efficiency and the product quality are two important guidelines for this department. However, the interviewee emphasized the need for clearer operational rules within the department. The most of the procedural know-how is intangible. The Director of the M&S department depicted a situation where marketing managers in different branches of the organization are free to initiate different campaigns in order to reach to pre-set target point. This target is based on a pyramid presented underneath (Figure 4.1).
Empirical findings

The existing work routines and practices governing the tasks performed by M&S department are seen as insufficient to guide the work of the unit in the future. Therefore, the Director of the M&S department expressed a wish for more specified and formalised rules that can help perform the work tasks.

The answers related to the actors were provided very briefly. The Director of the M&S department placed an organisational chart at the interviewers' disposal. In this way the interviewee gave the opportunities to the authors to obtain a deep understanding and a full picture concerning the organizational structure of the department, as well as the number of actors; their positions and responsibilities within the investigated department.

In relation to the fourth group of questions, the interviewee drew Figure 4.2, presented underneath, which briefly explained the interaction between M&S and PD departments. At the beginning of the development process marketing function assists in recognizing features that benefit customers. When the marketing campaign starts the marketing and sales people try to articulate the benefits of the newly developed product to the target customers. The Director of the M&S department refers to this concept as Benefit – Idea – Benefit (Figure 4.2).

Figure 4.1 - Pre-set target point.

Figure 4.2 - Involvement of the marketing function during the PD process. Benefit – Idea – Benefit.
Empirical findings

The interviewee explained that a formal way of interaction between the studied departments is the Assortment Council (AC). It is an organizational body responsible for maintaining the product portfolio according to present and future needs. The Director of the M&S department explained briefly the role of marketing function within the PD process. The first stage of the PD process is the idea generation. In this stage the input comes from the following functions: designers, architectures, constructors, manufacturing, purchase, and marketing.

The second stage of the PD process is the actual product development. During this stage the Assortment Council refines the already generated ideas of a new product and makes the final decision about the product concept. Designers, who are part of the PD department, are responsible for creation of a product solution around the new product concept. In case of project approval the M&S department is informed about its "start up", as well as the estimated completion time. On the base of this information the marketing people calculate the time needed for the product to be launched on the market, as well as decide when to start the marketing campaign. These calculations are made considering the time needed to train the sales staff on all the new features of a product. The training takes a couple of months and needs to be completed before launch of a product.

In relation to the group of questions concerning the communication issues the Director of the M&S department explained that the meetings of the Assortment Council are formalized and its course well documented. A formal way of storing the information are protocols, spread to all Product Managers involved in the development process, and stored in electronic form. Further, the product development process is a complex activity, which consists of a series of interrelated tasks. The pre-study requires interaction between the following actors and units: designers, architectures, constructors, manufacturing, purchase, and marketing. The Director of the M&S department explained that the communication between the above mentioned functions is not formalised. Meetings and forums are a typical communication channel during this stage. Very seldom there are occasions when written reports are developed. According to the Director of the M&S department the reason for the informal communication is the medium size of the company and a close location of departments to each other.

Another valuable communication channel is the intranet. Access to the information in the intranet depends on the status of the developed product. Before product launch the information is available only to the Sales and Marketing Managers. This information includes budgets, risk analysis, plans for introduction of the product to the market, as well as other details such as estimated product price and so on. After the product is launched the information is available to everyone in the M&S department. This information is concerned with presentations, and marketing guidelines. The current state of the information in the intranet was described as satisfactory.

According to the interviewee the company lacks coordinated marketing actions. M&S department meetings are informal, and triggered on ad hoc basis for a specific product area. Moreover, the information concerning the needs of local markets is not stored in an external repository. In addition there is no Customer Relationship Management (CRM) system. The information concerning requirements of different markets is obtained during International Company meetings carried out once a year. Each region should run their own business and there are no general guidelines for consolidation of marketing campaigns.

The Director of the M&S department expressed a need for better communication and integration of both departments. As reasons for this need the interviewee pointed out the ne-
cessity for increasing the participation of the M&S department in the PD process, shortening the time and minimizing the cost of developing marketing materials.

The answer to the question concerning the personal relations between the people from both departments was that the marketing people have stable relations with the other department. The research revealed no serious clashes between departments. The only limitations on the work of the M&S department come from designers, and European Union (EU) regulatory bodies.

The performance of the employees in the M&S department is difficult to measure, considering its creative character and division of work within projects. The measurement is subjective and depends on the product success on the market, as well as the overall profit per product. There are no financial incentives for successful accomplishment of projects. There are however special team building activities for the best performing project teams. Feedback is given to individual workers.

4.2 Results obtained during the interview with the Director of the Product Development department

The goals of the Product Development (PD) department at the Case Company are governed by a set of measurable objectives. The products developed within latest 3 year period should contribute to 20% of company’s present turnover. In addition, the goal is to shorten the lead times and to make the PD process more cost effective. Each stage of the product development process is controlled by well defined guidelines stated in the Case Company Project System (CCPS) protocol.

The Director of the PD department emphasized the importance of the product quality. In addition, he explained that the product quality cannot be compromised by using cheaper components in the manufacturing process. The Director of the PD department explained that the Case Company uses benchmarks as means to understand the products of competitors and to set standards for their own products. The company goal is to create better product solutions and at the same time to keep the price at acceptable level. The Director of the PD department believes that this thinking will ensure long lasting relationship with customers. The Director of PD department perceives opportunities for development and implementation of new technologies into next generation products.

In relation to the second group of questions concerning the existing rules within the Product Development department, the interviewee is rather satisfied with the inter-departmental guidelines. At the Case Company the work of PD department and the process of creating new products is controlled by a set of precise guidelines. These guidelines are stated in the CCPS protocol. It includes rules guiding the product development cycle and describes all functions involved in the product development process: purchasing, laboration, production, marketing, prototyping, and product management. The CCPS protocol is a subject to constant improvements and evolution. The PD process is ISO certificated.

There are two types of measurements used to gauge performance of the PD process, which are connected to both the product and the PD process itself. Product is evaluated based on its fit with predevelopment prognosis concerning utilization of resources, as well as meeting the target costs. The process in turn is measured by milestones - pre-set timelines for performing different stages of the PD process.
In relation to the third group of questions concerning the Director of the PD department provided the interviewers with the following documents for analysis: organizational structure, job descriptions, and the CCPS protocol. Owing to this the interviewee gave the opportunity for the authors to obtain an elaborated picture of the structure of the departments, the number of employees, and their responsibilities.

The Director of the PD department explained that the Assortment Council (AC) is one of the most important organizational bodies involved in the PD process. The body consist of Directors of the studied departments, Lightning and Development Manager and has regular meetings scheduled every six weeks. The main purpose of the AC is assessment and evaluation of new market trends and customer requirements. This assessment is performed on a yearly basis during AC visits to the most significant markets of the company: Sweden, Finland, Denmark, Norway, UK, and Netherlands. The visits encompass two days meetings with local management during which the most important features of the future products and ways to market them are identified. The Figure 4.3 presented below depicts the structure of the AC.

![Figure 4.3 - The Assortment Council.](image)

Besides the AC Product Managers have a great influence on development of new products since they have frequent interaction with the Sales Offices and customers. The Director of the PD department perceives Product Managers as market people since they have deep knowledge about the future market trends. In contrast to the sales people, Product Managers are able to predict what will be the most important product features in the future. Product Managers are the body that connects the input from customers with new technologies. AC assists the product managers in applying new EU regulations and standards to new product ideas.

The Case Company does not have dedicated research and development department (R&D). The functions of R&D are carried out by Product Managers, design managers, the Directors of the PD and M&S departments, and one expert from the PD department, who are familiar with the future standards. These R&D people realize the connection between upcoming technologies and architectures that are responsible for designing products.
Concerning the involvement of the marketing function within the PD the interviewee explained that the marketing and sales people together with the Director of the PD visit clients in order to investigated and capture what the customers want. The interviewee explained that he is satisfied with the present interaction between the departments. Further, the interviewee emphasized on the fact that the manufacturing personnel is involved in the product development process starting from the pre-study.

The product development process starts with a pre-study initiated by Product Managers, who state the product specification. They are responsible for conducting project analyzes which includes areas such as future product implications, costs, development time, efficiency, sales profits, and target market. In addition they carry out analyzes of the product fit in existing portfolio. Products are designed according to market expectations, trends, opinions of specialists such as architects and constructors. This phase takes 3 up to 4 months, and requires careful process of calculations and analyzes. The company must be sure as to the estimated factors and that no problems will occur when project is run.

The pre-study ends with approval or rejection of the product development project by AC and top management. The decision concerning the future of the project is made considering company readiness to carry on the project and the budget issues. If needed necessary refinements are made. With the top managers approval the project "start up" begins, which is associated with allocation of resources and building a cross functional project team. The project teams are obliged to follow the CCPS procedure. In special cases responsible for carrying out product modifications is the manufacturing personnel.

The Director of the PD department explained that with the management approval the actual product development process starts. It includes activities such as designing work, electrical testing, as well as controlling the project track to make sure it is in line with client wishes. This phase results in a physical prototype of a product, which then is examined and tested in the field by customers. The field tests are conducted together with Project Managers and marketing people responsible for the product. There is no standardized way to document the results of the field tests. The documentation protocols are prepared in accordance and depending on the intended goals of the test. The tests are concluded by a discussion within the project group.

The Director of the PD department perceives the future need for faster product development process in order to remain competitive on the market. (He made a comparison with the way in which an electronic business comes up with new solutions and products). He thinks that the company needs to find its way and to take some parts of the way the electronic business (phones, computers) develop products. He would like to get quicker to the market.

The Case Company developed procedure for solving problems occurring during the PD process. This procedure is carried out by project Steering Group. The Steering Group consists of Project Manager, the Director of the PD department, the project leader, the Plant Manager, and person from purchasing department. Each stage of the PD process ends with certain gates. The company has eight gates; from Gate minus Two to Gate Five. During these gates the Steering Group discusses issues concerning meeting the time plan by each unit. In case of difficulties for the unit to solve its problems the Steering Group can assist in finding solutions.

For the fifth group of question the interviewee answered that the communication between M&S and PD department at the Case Company generally is not formalised. It is based to a
large extent on interpersonal relationships and direct face-to-face interaction, thus actors in both departments have good knowledge of one another. Nonetheless, the research revealed that the interpersonal knowledge of employees within the departments increases together with professional experience at the Case Company. Thus, the acquaintances between people with long practice at the Case Company are much more developed than for people with shorter work experience. The communication relationships between the two departments were described as stable and frequent – conducted on a daily basis. The frequency of interactions is facilitated by close physical location of both departments, which allows for face-to-face communication whenever such a need arises. The face-to-face interactions are complemented by phone calls, which are identified as second most valuable communication channel.

The Director of PD department mentioned that the frequency of meetings arranged with representatives from local Sales Offices is sufficient, however a need to structure them in a more organized way was expressed. In addition the interviewee would like to have more thorough investigation concerning future market trends.

There is no standardized way to document the results of the field tests. The documentation protocols are prepared in accordance and depending on the intended goals of the test. The tests are concluded by a discussion within a project group.

During the PD process the checklist is a standard assistant tool which collects information about the different technologies. This information can be used for completion of certain tasks within the development process. In a case of availability of new technologies the checklist is updated. The checklist is a repository of "hard" information concerning the design and technologies that are important for the future product development projects. The other type of information that concerns products is "soft" e.g. information concerning market trends. The soft information is not a part of the checklist and the company does not have a standard way for storing such type of data. The Director of PD department expressed a need for developing a database where soft information can be stored. To certain extent the soft information is stored using 40 standard papers included in the CCPS guidelines.

The knowledge of most of the employees in the company is tacit and there are no mechanisms or tools allowing the company to store and/or reuse it. One example can be ambiguous definition of the concept of product quality which is a subject to constant debates between the company employees. The definition of the product quality is easily comprehended by employees with long experience in the company. The newly arrived employees however experience difficulties in understanding the product quality issues. The Director of the PD department believes that the product quality has many definitions that depend on different perspectives. Thus there is a need of codifying and storing information concerning organizational routines, work practices, and concepts, taking into consideration a variety of perspectives for e.g. customers, manufacturing issues, or marketing. For the customers the most important values that define the quality of a product are easy installation and maintenance. The marketing people on the other hand define the product quality in terms of delivery time, and meeting customer expectations.

According to the Director of the PD department cooperation between departments is free from conflicts. The biggest problems however occur when the products are not delivered within specified timeline, which causes the plans of the M&S department to change, and therefore makes scheduling of activities such as photographing difficult. This problem however is not related to the product development process itself but to the production is-
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sue, such as fully booked production lines, or problems with deliveries of raw materials by suppliers. There are additional limitations that originate in the external environment, and thus cannot be controlled by the company, such as designers and European Union (EU) regulatory bodies.

The performance of employees in the PD department is measured according to the time involved in a project, quality of work, meeting deadlines, and pre-set goals. Individual performance is not taken into consideration and the performance of a project team is measured as a whole due to creativeness of the work. Yearly feedback is given to all the employees within the department. There are no individual incentives for the employees, however there are rewards for successful accomplishment of projects in form of "end-up meetings".

4.3 Results obtained during the interview with the Marketing Support Manager

The position of the Marketing Support Manager is concerned with supporting the Sales Offices with marketing and training materials, and presentations. It is a function that has direct interaction with the PD department. The manager is responsible for gathering information about the products from the PD department, and then refining it for marketing purposes.

The outputs of the interviewee’s job are marketing and training materials such as printed and web catalogues and journals. Marketing materials include detailed information concerning products specifications and their intended applications. For development of marketing materials the M&S department needs to gather information about the products that can be easily understood. The information needed is concerned with unique features and characteristics of a new product. Nonetheless, the gathering of this information from Product Managers is not easy. The interviewee explained that people from the other department often forget about the intended customer needs that will be satisfied with the developed product. Therefore, there is a need to document product related benefits for a customer from very early stages of the PD process. The developed materials constitute a support for the Sales Offices when they talk to customers about products features, as well as to educate customers about rules of products installation and maintenance.

The marketing function is involved late in the PD process when the product is ready for manufacturing. In special cases when a product is coming with special features the M&S involvement starts earlier to try to understand the unique features of the product.

In relation to the questions concerning goals of the organizational unit, the interviewee explained that the Marketing Support Unit is guided by financial goals. In order to achieve this, the unit focuses on producing high quality marketing materials that will increase sells of the Case Company products. Special focus is put on cost-effective presentation of products including photographing, printing, and efficient work of the department. However, there are no measurable goals to be achieved by the M&S department. The cost-effectiveness is measured by comparing the costs of running the department to previous years.

In relation to the third group of questions the interviewee explained that the communication between employees from Marketing Support Unit and PD department is frequent and it is conducted on daily basis. This is possible thanks to close location of both departments.
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to each other which allows them to communicate face to face whenever such a need arises. In most cases the interactions between the departments are not formalised.

Regular and formalized meetings which include Marketing Support Manager and Product Managers are not organized. The communication between the above mentioned managers is through face-to-face meeting and phone calls. The Marketing Support Unit has a big meeting only once a year where it is discussed what products are coming up for the next catalogue, how many products are there in the series, and so on. The meetings last around one hour. The unit is provided with a plan about the new products.

The M&S department does not have difficulties concerning the information delivered by the PD department. However, there are cases of delays at the PD department that jeopardize plans of M&S concerning preparation of the marketing materials such as photographing and measurements. The interviewee provided an example, that is, the marketing people need results from the tests of prototypes for the development of the marketing materials. They need also the photometric pictures. Sometimes the Marketing Support Unit experience difficulties (when the product is late) to get all the data on time. Therefore, the interviewee explained that this causes difficulties in following the deadlines set within the unit. The M&S department is not involved in testing; they only get results of the tests.

The M&S department trusts the information delivered by the PD department. In some circumstances however the clarity of information is an issue. People in the PD department often use language that is too complicated and difficult to understand by potential customers. Even the M&S personnel often has problems to comprehend the delivered information. Therefore, the interviewee explained that the Marketing Support Unit often needs to make queries to clarify certain concepts. In turn, the Marketing Support Manager expressed a need for a simplification of the technical language to enhance efficiency of the M&S department.

The information required for the M&S department to prepare marketing materials (product tests results) is sent to the department in an electronic form in two different types of file extensions: MS Word documents and MS Excel spreadsheets. These documents then need to be combined in the product database. The current structure and design of the database meets the expectations of the unit and it is easy to use, therefore the users indicated being satisfied from its use.

A drawback related to the above mentioned statement concerns directly production of the marketing materials by the M&S department. Developing marketing materials involves dealing with large amounts of data about products features and specifications. This data is send to the M&S department in two different types of file extensions: MS Word and Excel spreadsheets. The content of both files however needs to be entered by the M&S department personnel into the product database. At present this process is manual, thus it consumes a lot of time, and therefore is considered as a troublesome activity. The M&S department would like the employees in the PD department to perform this activity by themselves, as it will save time for both the PD and M&S department, instead of creating two different types of documents that later on need to be dealt with by the M&S department.

In addition there is a problem with products numeration. M&S department complained that they must manually find and enter the product number into the product database. Consequently, there was expressed a need for better integration between existing systems.
5 Analysis and diagnosis of the Case Company

This chapter is concerned with the analysis and diagnosis conducted at the Case Company. It delves into the business processes of the Marketing and Sales (M&S) and Product Development (PD) department and aims to provide an objective snapshot of the business practices within the studied interface. The analysis resulted in a number of change needs to better equip relevant actors and change agents to enhance the quality of the internal services, and thus the internal customer satisfaction. The analysis and diagnosis encompassed two organizational units, namely the M&S and PD department. The gathered data was used to create the EKD models depicting different facets of the Case Company within the studied interface. These models were described in the following order: the Goals Model (GM), the Business Processes Model (BPM), the Actors and Resources Model (ARM), the Business Rules Model (BRM), and the Concepts Model (CM).

5.1 Goals analysis

At the beginning of the analysis the gathered data was used by the authors to identify the Case Company goals, and therefore it was the initial model. After understanding the goals and related problems the authors were able to comprehend and analyze the working procedures within the M&S and PD departments at the Case Company, as well as to understand the existing level of integration and communication between the above mentioned organizational units. Many goals were related to each other which made it feasible to group certain goals and find one common supper ordinate goal. This in turn facilitated the process of identifying major change needs which to enhance the internal service quality, and hence the internal customer satisfaction within the studied interface at the Case Company. The final version of the Goals Model (GM) is presented in Attachment 3.

5.1.1 General goals analysis

The most prioritised goals are numbered from one to ten in the GM, and presented in Figure 5.1 underneath. These goals were identified as inevitable in order to turn the interface between M&S and PD department at the Case Company into an efficient system contributing to company’s success on the market. Extensions of this model were further described in the following sub-sections and presented in Attachment 3.

Figure 5.1 - The general Goals Model.
The major goal is to alter the ways of working in the interface in a way that assures sustainable growth of the Case Company (Goal 1). This includes long term oriented and efficient processes while being cost conscious. Direct sub-goals are "Creating a strong brand" (Goal 2), "To ensure double digit growth and profitability" (Goal 3), and "To maintain and ensure harmonious internal structure of operations" (Goal 4). Each of these goals will help to turn the Case Company into a successful organization. Some of them can be implemented within a short time horizon while others are long term commitments. Furthermore, the goals assisted in identification of problems hindering fulfilment of goals, and potential opportunities that the company can take advantage of.

One general goal of the Case Company is to create a strong brand (Goal 2) (Section 4.1). This is especially relevant if one takes into consideration the latest financial performance of the organization and its shrinking profits in comparison to previous years (Case Company, 1, 2010). The M&S department is an organizational unit which is to a large extent involved in the activities aimed at leveraging the company's image (Section 4.1; Case Company, 9, 2010), and therefore contributes to increased sales, as well as gives the company possibility to charge customers premium prices for company's products and services (Gulati, 2007). This goal was further decomposed into two sub-goals. First of all it is necessary to develop products that meet customer requirements' and industry standards (Hart et al., 1999), therefore the decisions made in PD department concerning development of new products need to be supported by reliable information (Goal 6) (Bergman & Klefjso, 2007; Souder & Chakrabarti, 1978; Massey & Kyriazis, 2006). The M&S department hitherto existing supporting role in the product development process needs to be substituted on active involvement (Kahn, 1996; Gupta et al., 1985; Hart et al., 1999). Finally, the Case Company should concentrate on attracting customers' attention on company products, and delivering consistent, precise, and complete information concerning company's product portfolio (Section 4.1; Section 4.3; Case Company, 6, 2010). Thus, it is expressed in the GM as a need to ensure high level of counselling to the customers (Goal 5).

The Case Company aims at becoming one of the world leaders in providing professional lighting solutions (Section 4.2; Case Company, 11, 2010). This in turn requires from the company achieving good financial results and fast growth, which is depicted as Goal 3 of the GM - to ensure double digit growth and profitability (Case Company, 11, 2010). One factor that has influence on company's performance on the market is incorporation of new technologies into products (Section 4.2). The market of lighting solutions is subject to constant evolution and changing standards (Case Company, 6, 2010), thus leading to ever-growing customer expectations (Section 4.2). In order to survive on the market the company must be innovative. Stable double digit growth however requires being one of industry leaders in implementing new technologies into products, which is depicted as Goal 7 (Section 4.2; Case Company, 11, 2010). Last but not the least it requires leveraging the size and competencies of the organization (Goal 8) (Case Company, 6, 2010). It is important that the company utilizes its all resources and leverages not only on its long traditions in the industry (Section 4.2) but also on knowledge of all individuals that worked, work and will be involved in companies business (Awad & Chaziri, 2004).

After the analysis of the gathered data it became apparent that the interface between M&S and PD departments has gaps in terms of delivered information, as well as employees' perception and understanding of information due to different backgrounds, experience, and reasoning, therefore inhibiting the organization to reach high efficiency and realize its full potential. This barrier for cross-functional integration is also recognized by Leenders and Wierenga (2001). Thus, there was a need to further address this issue, which is expressed by
Goal 4 – to maintain and ensure a harmonious structure of internal operations. This need is associated with the harmony of cross-functional climate that affects the level of collaboration between the studied departments (Parry & Song, 1993; Moenaert et al., 1994). During the course of modelling this goal was decomposed into two sub goals. Harmonizing internal structure of operations requires instant access to information within the company (Goal 9) (Pearlson & Saunders, 2010), and maximizing the internal customer satisfaction (Goal 10) (Bergman & Klefsjö, 2007).

5.1.2 Detailed goals analysis

The 10 main goals that were discussed above provided a key to uncover a whole range of in depth situations in the Case Company that needed to be individually addressed. Each of the 10 major goals has been broken down to deal with specific circumstances to provide a beacon for overall optimal performance. The breakup of the goals has been presented below in three sections related to different organizational aspects, namely the work of the M&S department, the work of PD department, and enhancing the internal service quality, and thus the internal customer satisfaction.

Marketing goals

In order to deal with shrinking sales the issue of counselling to the customers’ needs to be addressed. Therefore, there is a need to train the Sales staff on all new product features, products application, and installation (Goal 13) (Section 4.2). The training must take place before the actual product launch (Section 4.2) so that the Sales staff will have a deep knowledge of product, and therefore give constructive advices to potential customers (Section 4.3). Training of the Sales staff requires high quality training materials (Goal 12) (Section 4.3). High quality in these circumstances refers to translation of the product features into customer needs (Section 4.3). This argument is supported by Gupta et al. (1986). In addition, to support Goal 5 there is a need to produce high quality marketing materials (Goal 11), which will similarly alter and emphasize on unique features of the products (Section 4.3). In addition, measuring effectiveness of the marketing campaigns can be used to determine which are the most successful in terms of encouraging potential customers to place an order (Goal 25). Consequently, it will contribute to saving departmental costs.

One of the problems identified after analyzing the gathered data is low involvement of the marketing function in the product development process. As mentioned in Section 2.1.1 according to Hart et al. (1999) and Gupta et al. (1985) the main role of the M&S department within NPD process is the reduction of market uncertainties in terms of customer information and competitors. This information is crucial for future acceptance of products on the market and therefore, the involvement of the unit must increase (Moenaert et al., 1994; Kahn, 1996; Gupta et al., 1986). The decisions made during the different stages of the product development process should be based on facts (Bergman & Klefsjö, 2007), thus the department should emphasize on recognizing customer needs (Goal 14) and understanding the industry in which the company operates (Goal 15) (Ulrich & Eppinger, 2008). Hart et al. (1999) recommend gathering and utilization of information incorporating industry competitive forces, rivals strengths, as well as the nature of competition, which is depicted on the GM as Goals 30, 31, and 32 (Table 2.3). Identification of customers’ needs on the other hand requires gathering deep insights concerning customer requirements as to the products and services (Goal 29) (Table 2.3), which can be fulfilled through conducting frequent face to face meetings with customers (Goal 50), conduct surveys and interviews with none customers (Goal 51), and analysis of the transactional data (Goal 52) (Ulrich & Eppinger, 2008). Furthermore, Hart et al. (1999) advises defining the market segments
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(Section 2.3) gathering data determining the level of needed product innovativeness in particular market segment (Goal 48) and analyzing buyers' behaviour (Goal 49). The role of these activities has a supportive character. Last but not the least, understanding customer needs should be supported by determining potential product opportunities (Goal 27) (Ulrich & Eppinger, 2008).

Product development

Forefront position in developing of solutions around new technologies is an identified prerequisite for the company to ensure stable growth (Section 4.2; Case Company, 11 & 6, 2010). The goals identified in this area should be concentrated on understanding new technologies (Goal 16) (Section 4.2), ensuring world class innovation processes (Goal 17) (Ulrich & Eppinger, 2008), as well as accelerating investments in product development projects (Goal 18) (Case Company, 11, 6 & 8, 2010). Deep understanding of new technologies will help the Case Company to solve problems related to customers' requirements concerned with extending products life cycles and pressures from external regulators concerned with meeting energy consumptions norms and safety standards. It is depicted as Goals 33 and 34 of the GM. To reach world class innovation processes solving some organizational problems such delays in the product development projects caused by poor scheduling of the production lines in the Manufacturing department, delays in deliveries of raw materials by suppliers (Section 4.2), as well as clarification of the concept of the product quality between different generations of employees is required (Parry & Song, 1993). These problems were identified during the analysis as the main inhibitors to reach undisturbed product development processes. Therefore, ensuring world class innovation processes requires among others delivering on time the right product quality (Goal 36) (Ulrich & Eppinger, 2008). This argument is supported by creating procedural rules for purchasers to follow when replenishing existing stocks (Goal 46), to have deep understanding of product quality across the organization (Goal 47) (Parry & Song, 1993), as well as to benchmark product fit within the prededvelopment prognosis (Goal 48). Supporting purchasers' decisions can be fostered by developing statistics to check which suppliers are more reliable and to determine reference level of quality (Goal 53 - 54). In addition in order to reach world class innovation processes it is necessary to benchmark competitors innovation processes (Goal 35). Accelerating investments in product development projects (Goal 18) is necessary in order to realize Goal 37, which advocates that products developed within last 3 years should contribute to 20 % of present turnover (Section 4.2). One way to achieve Goal 37 is meeting customer requirements in a best possible way. Accelerating investments is required to maintain stable increase of turnover each year by 20 % (Goal 38) (Section 4.2). Last but not the least, high share of customized products (Goal 19) and broad product portfolio (Goal 20) are identified as prerequisites to fulfil Goal 8.

Effectiveness

In order to maintain and ensure harmonious internal structure of operation (Goal 4) initiation of instant access to information and collaboration within the company (Goal 9) is necessary. In order for this to happen a plan needs to be put in place. The plan includes a review of the existing IT system, after which if needed new IT solution for the business should be implemented (Goal 21 - 22) (Ward & Peppard, 2002). When an IT solution is to be introduced there has to be a clear division of the company within the IT infrastructure so as to enable an easy flow of operability (Goal 40) (Chaffey & Wood, 2005). The investigation conducted in the M&S and PD departments revealed gaps in this area. The current level of information concerning the new products development is too limited. Information inevitable for the M&S department to prepare marketing materials is sent to the depart-
ment in an electronic form in two different types of files and later on needs to be manually entered into the product database (Section 4.3). This information however, should be seamlessly available for the department and update through all stages of the product development process in order to maximize the effectiveness of work (Laudon & Laudon, 2006). Thus, all the various branches and sectors of the business need to be connected to the common database, and finally every operation should be automated, nothing should be left to manual handling (Goal 55 – 56) (Kroenke, 2009). At present the directors of each organizational unit at the Case Company are responsible for defining the business requirements for IS/IT infrastructure to support the work of their departments (Case Company, 2010). This however creates a threat for the organization, since the Directors are specialist in their own fields and do not posses knowledge considering eliciting business requirements for the IS. Moreover, the identification of the IS requirements demands involvement of the personnel that has direct contact with the system on a daily bases, and is involved in performing work tasks, instead of giving this responsibility to Directors who play mostly coordinative and control roles. Inaccurate definition of business can have catastrophic impact on the organization (Pearson & Saunders, 2010); therefore involvement of the bottom line of employees in the process is necessary (Oz, 2004). Harmonious internal structure of operations can only be achieved by providing the employees with tools for collaboration that are seen as desirable from the business perspective. Therefore the goal is to transform business requirements into cost efficient, value adding IT solutions and providing services according to the client needs (Goal 39) (Ward & Peppard, 2002). In addition assuring instant access to information and harmonious internal structure of operations, calls for maximizing the internal customer satisfaction (Bergman & Klefsjö, 2007). On the one hand this can be achieved through satisfying the needs and requirements of every process (Goal 23). The chain of processes at the PD department at the Case Company, in opposite to the M&S department, is well documented and has stated clear requirements as to the inputs of a process and the required outputs. Therefore, it calls for mapping organizational processes and outlining content and relations between different activities and introducing uniform standards of handling processes, information and materials (Goal 41 – 42) (Tolis, 2005). In addition mapping the processes will allow the directors to measure the performance of particular activities performed as a chain, and therefore give a possibility to relate it to performance of previous processes, pointing out possible improvement areas. This is depicted as Goal 57 of the GM. On the other hand maximization of the internal customer satisfaction can be achieved through creating environment in which the individual needs of employees for self-development and self-motivation are guaranteed (Goal 24) (Bergman & Klefsjö, 2007). As the literature describes (Horovitz & Jurgens-Panak, 1994; Farmer et al., 2001; Parry & Song, 1993), it requires undertaking several interrelated actions. First of all the output of employees work should be evaluated on a regular basis after accomplishment of assigned tasks (Goal 43) (Horovitz & Jurgens-Panak, 1994). The feedback to employees at the Case Company is given rare, usually during every year’s meetings; therefore this issue needs to be addressed. One potential solution for improvements in this area is organization of improvement groups and forums (Goal 58). Second of all employees satisfaction surveys are a necessity (Farmer et al., 2001). At present there is no such a form of evaluating employees’ satisfaction at the Case Company. Last but not the least, according to Parry and Song (1993) it is advised to articulate and share common goals across the organization (Goal 45). According to the conducted analyzes the company at present has a set of goals and vision to pursue, it is however difficult to categorize and prioritize these goals. This goal can be fulfilled for instance by organizing congress meetings (Goal 59).
5.2 Process Analysis

This subsection is concerned with process analysis conducted based on the data gathered during the interviews, and documents delivered by the Case Company (Case Company, 3 & 9, 2010). This data was used to develop a Business Process Model (BPM) following principles of the EKD method. The model provides a detailed overview of the product development processes and its integration with the marketing and sales processes. Due to the developed model the authors were able to obtain deep insights of the existing integration and communication channels within the studied interface. The developed model can be found in Attachment 3.

Overall, this model presents two primary processes:

- Product Development processes;
- Marketing and Sales processes.

The delimitations between these two processes are based on the following criteria:

- Actors and organizational units involved;
- The resources needed;
- The anticipated outcome;

The following paragraph includes in depth model description. Model creation was subjected to a broad discussions and a long process of evolution until the final version was reached.

5.2.1 Product Development processes

This process is concerned with development of new product solutions. It plays an important role for the success of the Case Company on the market in terms of customer satisfaction and competitive capabilities.

Process 1 - Evaluation of the product idea by the Assortment Council
The process entails the Product Development Director; Marketing and Sales Director; Lightening Technical Manager; and the Product Manager responsible for the investigated process, who assess whether a new product idea is conformed to company strategy and capabilities. The ideas originate from internal (mainly product managers) or external stakeholders (architects, consultants, designers).

Process 2 - Revision of the product idea
In a case of rejection of the project idea it is given an opportunity of the Assortment Council to rethink its decisions. The project idea can be revised and a new conclusion can be reached.

Process 3 - Designing of product concept
This process is initiated when the Assortment Council approves the project idea. Product Manager is mainly responsible for conduction of the concept study. In this process the Product Manager and the Product Development Director organize meeting with the interested parties and discuss ideas for the project start-up.

Process 4 - Inform M&S department about the project start-up
This process realizes the connection between the departments under study. The process aims at informing the M&S department about the new product idea. The information con-
Concerning the product idea includes explanation of new product opportunities, distinguishing unique features of the product, as well as the benefits of the new product for the customer.

**Process 5 - Evaluation of the product concept**
The main role in this process has the Steering Group, and particularly the Product Manager. Decisions on a concept to be pursued or to be rejected are made.

**Process 7 - Conducting feasibility study**
This process is initiated when the product concept study is approved. Feasibility study involves further development of the product study. The main objective of this process is the project composition. The responsible for carrying out this process is the Project Manager. The outcome of this process is a decision support tool that will assist in starting-up the project. Furthermore, the initial product specifications and resources needed to accomplish the project are assessed.

**Process 8 - Evaluation of the project feasibility**
During this process prototypes are presented according to which project feasibility is evaluated or rejected by the Assortment Council.

**Process 9 - Project design**
This process is initiated with the updates of the project analysis obtained during the evaluation stage. The investments are approved by the top management. Risk analysis is carried out and subsequently presented to the Steering Group. Product specifications are communicated and accepted by all project members. Preliminary calculations are performed on the developed variants and decisions are made concerning the price targets. The suppliers and partners are informed officially of the new project characteristics and purposes.

**Process 10 - Review of the project design**
This process has an assessment character and plays an important role for the project success.

**Process 11 - Product construction**
Product construction process starts with updates of the risk analysis with results obtained from the previous process. The process is concerned with development testing and light measurements with selected prototypes. The sample montage of the new product is carried out by the manufacturing personnel. Preliminary calculations are updated. All tools associated with the design documents are accepted by selected providers (internal and external suppliers). The number of initial samples and the content of the measurement protocol is discussed with internal and external suppliers.

**Process 12 - Approval by responsible engineer**
This process is concerned with the responsible engineer approval of the initial samples.

**Process 13 - Securing orders and deliveries of raw material for 0-series**
Drawings assist in explaining the product features that needs to be created during the 0-series. Critical details to the 0-series orders are secured with the suppliers.

**Process 14 - Preparing equipment and instructions for manufacturing**
The factory is being prepared for the production of the 0-series. The equipment and the manufacturing instructions are ready for production of the 0-series. A test assembly is performed.

**Process 15 - Producing 0-series**
This process entails production of the 0-series.
Process 16 - Revision of the 0-series
The results obtained during the initial 0-series are evaluated. Light measurements of the 0-series are completed. Orders securing critical material for the 1-series are made. More detailed drawings of the new product are developed.

Process 17 - Securing orders and deliveries of raw material for 1-series and the Main Line
Critical materials are secured with suppliers. The number of the orders is discussed.

Process 18 - Preparing equipment and instructions for manufacturing
A plan and forecast for production is developed.

Process 19 - Producing 1-series
This process entails production of the 1-series.

Process 20 - Final Test of a product
The tests of a new product are completed and the product is ready for market launch.

Process 21 - Evaluation of the product by the Steering Group
The Steering Group evaluates production and assembly readiness for a new product. The Steering Group approves the project end.

Process 22 - Project evaluation meeting
The project group is summing up the results of the development project in terms of meeting the timelines and used resources.

Process 23 - Sending the results to the M&S department
This process is associated with the transfer of information about final product test results to the M&S department.

5.2.2 Marketing and Sales processes
The processes can be considered as complementary to the PD process. The main function of this process is marketing of the Case Company brands and products. Further, this process includes development of marketing material and training materials that support Sales personnel in counselling customers.

Process 6 - Calculating the approximate product launch date and the start-up of the marketing campaign
Based on the documentation of the initial product idea and included estimations as to the PD project accomplishment the M&S department calculates the preliminary product launch date, as well as the start-up of the marketing campaign. All this is presented in the marketing plan.

Process 20 - Photographing the product for the marketing purposes
The process is concerned with photographing the products which are included in product catalogues and marketing materials.

Process 25 - Entering the results in product database
Manual process of entering the results of product tests into the product database. The database entrances consist of information used for technical description of the product properties that is incorporated in the marketing materials.

Process 26 - Producing marketing material
This process entails developing of marketing materials. For this purpose photographs and the results obtained during the test are used. Marketing materials include thorough description of the unique characteristics of every product.

5.2.3 The current integration between M&S and PD departments during the product development process

Throughout this section the authors answered RQ1 concerned with the current level of integration between M&S and PD department at the Case Company during the product development process.

Comparison between the existing processes within the studied interface at the Case Company with the literature helped the authors to investigate the problematic areas and formulate the change needs. According to the present state of processes visualized by the means of Business Process Model (BPM) it is clear that Process 1 and 2 correspond to the Planning Phase, Idea Generation Phase and Idea Screening Phase specified in Section 2.1.1. One positive thing for the Case Company is existence of the Assortment Council where marketing function is early involved in the product development process and assessment of a new product idea (Process 1). This organizational body incorporates the Directors of both departments, which according to Massey and Kyriazis (2006) and Maltz et al. (2001) is a prerequisite for achievement of good cross-functional working relationships (CFRs) and cross-functional integration. According to the Director of the M&S department ideas for new products originate from different functions across the organization and specifically marketing function (Section 4.1.). This is considered a major positive issue discussed by Gupta et al. (1985), Ulrich and Eppinger (2008), and Bergman and Klefsjö (2007). However, the results obtained during the interview conducted with the Director of the PD department revealed contradictory facts. It was clearly stated by the Director of the PD that the Product Managers (parts of the PD department) are perceived as marketing people, thus it was concluded that product ideas mainly come from the PD department (Section 4.2). Consequently, contradictory opinions between the perceived responsibilities of the other function were identified, which according to Massey and Kyriazis (2006) is a barrier for integration.

Furthermore, based on a comparison with the reviewed literature, a low level of integration of the marketing function within the NPD process was noticed. It was realized that the marketing function is concerned mainly with preparing marketing campaigns and to a less extent with identification of new product opportunities (Section 4.2). This argument is contradictory with conception of the product development process by Gupta et al. (1985), Ulrich and Eppinger (2008), or Bergman and Klefsjö (2007) who emphasize on the cross-functional integration for achievement of a successful NPD process. One important aspect that was detected is that the Product Managers are employees where the knowledge about current technologies, as well as the current and future customer requirements resides (Section 4.2), which implies that the knowledge is limited within the product development function. In addition, in Section 4.2 it was explained that the employees in the Sales Offices lack knowledge about the future market trends, caused by lack of frequent and coordinated market researches. This can be considered a major problem since it strongly differs from the arguments advocated by Gupta et al. (1985) concerning presence of the marketing intelligence in all the functions involved within the NPD process.
Furthermore, based on the Assortment Council (AC) functions (Sections 4.1 & 4.2) it is clear that M&S department participates in setting the project goals, and evaluation of the most promising ideas which is in accordance to Ulrich and Eppinger (2008). One issue that was recognized is that the primary goal of the AC is evaluation of the market and customer requirements. However, the body consist only of one representative from the M&S department, namely the M&S Director, whereas there are three representatives from the PD department, the PD Director, Lightening Technical Manager and the Product Manager. Another similarity that was discovered is a clarification of the benefits for customers by the M&S department during the first phases of the NPD process.

Based on the Business Process Model (BPM) it is identified that Process 3 – 10 correspond to the Physical Product Development Phase specified in Section 2.1.1. At the Case Company processes involved within the physical product development are similar to the ones that are considered important by Gupta et al. (1985), Ulrich and Eppinger (2008), and Bergman and Klefsjö (2007).

One dissimilarity discovered during the analysis is the fact that at the Case Company resource allocation (Process 7) is performed after evaluation of the product concept (Process 6), which differs from the recommendations by Ulrich and Eppinger (2008) concerning the need for assessment of resources during the Planning Phase. Participation of the marketing function in the Physical Product Development Phase is low. The only input comes from the Director of the M&S department involved in evaluation of the respective project steps by the AC (Process 5, 8 and 10), whereas according to the literature review marketing function should deliver information concerning market perceptions on the product quality, desirable product features, price and safety (Gupta et al., 1986). Participation of the other actors from the M&S department in this phase of the PD process is not clearly stated (Section 4.1 & 4.2). Therefore, as Parry and Song (1993) advocate there is a need for a clear division of tasks and responsibilities between the both functions. Moreover, in order to increase participation of the M&S department in the PD process it is necessary to acquire various types of marketing information mentioned above through explicit market research and benchmarks (Gupta et al., 1986). The only clear responsibility of the marketing function in the PD process does not directly involve the process itself and is limited to preparing of training materials and marketing campaigns (Section 4.3) depicted as Process 6 in the BPM. The involvement of the marketing function concerning the marketing campaign (Process 6) is in line with arguments presented by Bergman & Klefsjö (2007), who state that preparations for the marketing campaign should take place after approval of the product concept (Process 5). The necessary input to accomplish these tasks comes from different outputs of the PD processes (Process 3, 19, and 21). Delays within the PD process cause difficulties for the task completion by the M&S department, since this function is considered highly depended on the previous function (Section 4.2 & 4.3).

Processes 11 – 22 and 24 – 26 depicted in the BPM correspond to the Test and Product Commercialization Phase discussed by Gupta et al. (1985). At the Case Company this phase encompass several independent prototype tests (Process 11, 15 & 19). The field tests are carried out by representatives from both functions together with potential customers which is perceived as beneficial for achievement of desired customer focus (Horovitz & Jurgens-P anak, 1994). During these stages of the PD process the marketing function is primary concerned with preparation of training and marketing materials (Section 4.3). The product development function on the other hand has very low involvement in preparing of the marketing campaigns (Section 4.3) – limited to delivering tests results (Process 24) and the product for photographing (Process 20), which is contradictory to the arguments pre-
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sented by Gupta et al. (1985). The author recommends high level of interaction of the product development function in preparing marketing materials and technical manuals. A drawback concerned directly with production of the marketing materials by the M&S department is dealing with a large amount of data about product features and specifications. This data is send to the M&S department in two different types of file extensions: MS Word and Excel spreadsheets. The content of both files however needs to be entered by the M&S personnel into the product database. At present this process is manual, thus it consumes a lot of time, and therefore is considered as troublesome activity. The M&S department would like the employees in the PD department to perform this activity by themselves, as it will save time for both the M&S and PD, instead of creating two different types of documents that later on need to be dealt with by the M&S department. As mentioned earlier in this section marketing function is dependent on product development function which results in difficulties in case of delayed products (Section 4.3).

Process 23 corresponds to the Post Commercialization Phase discussed by Gupta et al. (1985). This process is in line with the results obtained from the literature review and it is perceived by the authors of this thesis as an advantage for the company.

Analysis of the current state of communication between the actors in the M&S and PD departments gave an opportunity to further analyze the level of integration which is the aim of the RQ1. This is due to the fact that cross-functional communication is a major factor to achieve high level of integration within the studied interface (Section 2.1.3). This argument is confirmed by Gupta et al. (1985), Hart et al. (1999), and Parry and Song (1993).

Generally, the communication between the M&S and PD departments is not formalized. The communication is based on interpersonal relationship and face to face communication (Section 4.1 & 4.2). Thus, it can be drawn a conclusion that at the Case Company activities are unstructured and formally not coordinated (Kahn, 1996). This can be seen as barrier for cross-functional integration, explained in details by Moenaert et al. (1994), Morelli et al. (1995), and Gupta et al. (1985). One positive aspect for the Case Company is that the actors from both departments have a good knowledge of each other (Section 4.2) which is a prerequisite for the communication quality (Massey & Kyriazis, 2006) and positive organizational climate (Moenaert et al., 1994), which in turn can lead to a better integration. Further, a good interpersonal knowledge can contribute to building an environment where good CFRs and functional conflicts (Massey & Kyriazis, 2006; Maltz et al., 2001) can be encouraged. However, acquaintances between employees depend on their professional experience in the company (Section 4.2). According to Malts et al. (2001) this can lead to inter-functional rivalry.

Further, it can be specified that at the Case Company, some of the inter-departmental interactions are formalized and well documented. This is the case of the AC (Section 4.1 & 4.2) where information is captured by the means of protocols and stored in an electronic form (Section 4.1). Formal meetings are recognized as a positive aspect since the information can be captured, transferred, and stored within the company. Furthermore, greater formalization of the communication channels helps the Case Company to enhance cross-functional interactions (Souder & Chakrabarti, 1978), clarify the workflow, and cross-functional consulting activities (Moenaert et al., 1994). It also can assist in reducing of the "role conflicts" (Parry & Song, 1993) and the quality of the decision–making process (Nonaka, 1991; Awad & Chaziri, 2004; Massey & Kyriazis, 2006). In this thread of thoughts, it can be added that the availability of checklist within the product development process (Section 4.2) is seen as an advantage. However, one drawback is that at the Case Company there are no means to capture and store the marketing information. It was inves-
tigated that the company does not have a standard way for storing such type of information which is important to achieve the right customer focus. This argument refers to the market orientation explained by Hart et al. (1999) and Gupta et al. (1985).

An advantage for the Case Company concerning the communication issue is a close physical location of the M&S and PD departments, which can realize their frequent and stable communication (Section 4.1, 4.2 & 4.3). Close physical distance is seen as a crucial factor for achievement of high level of cross-functional interaction and possibly lead to high levels of integration (Parry & Song, 1993; Leenders & Wierenga, 2001). High frequency of communication is an important dimension for mutual understanding in terms of professional language and expressions (Massey & Kyriazis, 2006).

A barrier for integration is low frequency of meetings with representatives from the Sales Offices located in 17 countries and the AC during the International Company Meetings. According to Massey and Kyriazis (2006) frequency of the communication is as an important factor for the information exchange, as well as market orientation across the organization (Gupta et al., 1985; Hart et al., 1999). The Case Company does not acknowledge it as a barrier (Section 4.2). The drawbacks are concerned with the way in which the meetings are structured and lack of sufficient investigation of future market trends by the Sales Offices prior to the meetings (Section 4.2). Insufficient marketing information can affect achievement of desired customer focus by the Case Company since incomplete information will not assist in reduction of uncertainties during the NPD process in terms of customer needs and expectations (Bergman & Klefsjö, 2007; Hart et al., 1999). Unstructured way of conducting the International Company Meetings is confirmed in Section 4.1. In addition it can be said that the lack of repository to store marketing information concerning the needs of local markets is an undesirable state of nature for the company.

Usage of intranet within the M&S department is seen as an advantage for the company (Section 4.1). Intranet is a mean of fast communication and transfer of information between functions of the organization located at great physical distance. The system is useful for learning and consultation activities which are important for achievement of high levels of integration (Moenaert et al., 1994). In relation to this there was identified a drawback. Intranet is used only within a function, but not for cross-functional communication. Thus, its benefits are not fully realized.

At the Case Company the employees trust the information exchanged between the departments (Section 4.3). In this connection a conclusion can be drawn that the quality of communication is good and affects positively the decision-making process within the studied interface (Massey & Kyriazis, 2006). However, the quality of the communication can be hindered by different professional backgrounds and languages of the M&S and PD functions (Leenders & Wierenga, 2001).

### 5.3 The change needs

The analysis and business diagnosis of the goals and processes at the Case Company has resulted in a number of change needs aimed at enhancing the internal customer satisfaction by solving the most prevailing problems. The change needs have been guided by problems, which were simultaneously modelled with the Goals Model (GM). All together six change needs were elicited. These change needs correspond to the more superior goals (Goal 5, 6, 7, 8, 9 and 10) of the GM. Below follows a list of the change needs:

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- Increasing the involvement of the product development function in development of marketing and training materials
- Increasing the involvement of the marketing function in the product development process
- Increasing the level of cross-functional cooperation
- Focusing on companies core competencies
- Improving integration and functionality of the computer based Information System within the interface to meet internal customer requirements
- Increasing control over the workflow

The Table 5.1 presented underneath depicts the above mentioned change needs in connection to goals expected to be fulfilled through the change needs, actors and resources required to realize the change needs, and business rules that at present govern the company. Due to the fact that the Actors and Resources Model (ARM) and Business Rules Model (BRM) have supportive role, in the following sections the authors describe only the components related to the specified change needs. The authors believe that the full description is not required for answering the RQs.

Table 5.1 – The change needs.

<table>
<thead>
<tr>
<th>Change need</th>
<th>Number</th>
</tr>
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<tbody>
<tr>
<td>Increasing the involvement of the product development function in development of marketing and training materials</td>
<td>1</td>
</tr>
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</table>

**Goal**
- Through the change need the following goals are fulfilled:
  - Goal 5 - To ensure high levels of counselling for customer
  - Goal 12 - To Create high quality training materials for the Sales staff
  - Goal 13 - To train the Sales staff

**Actor/recourses**
- Actors/resources needed to fulfill the goal:
  - Organizational Unit 12 - Product Management
  - Organizational Unit 15 - Project Management
  - Organizational Unit 7 - Marketing Support
  - Organizational Unit 11 - Sales Support
  - Resource 1 - Information System
  - Resource 4 - Marketing Material
  - Resource 5 - Training Material

**Rules**
- Rules that regulates or governs:
  - Rule 2 - The Sales staff must be trained about new products features before their launch
  - Rule 14 - The efficiency of a campaign shall be evaluated based on product sales
  - Rule 26 - The marketing material should emphasize unique features of a product and benefits for the customer

Increasing the involvement of the marketing function in the product development process

**Goal**
- Through the change need the following goals are fulfilled:
  - Goal 15 - To understand the industry
  - Goal 27 - To discover product opportunities

<table>
<thead>
<tr>
<th>Goal</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal 5 - To ensure high levels of counselling for customer</td>
<td>2</td>
</tr>
<tr>
<td>Goal 12 - To Create high quality training materials for the Sales staff</td>
<td></td>
</tr>
<tr>
<td>Goal 13 - To train the Sales staff</td>
<td></td>
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<tr>
<td>Organizational Unit 12 - Product Management</td>
<td></td>
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<tr>
<td>Organizational Unit 15 - Project Management</td>
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<tr>
<td>Organizational Unit 7 - Marketing Support</td>
<td></td>
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<tr>
<td>Organizational Unit 11 - Sales Support</td>
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<tr>
<td>Resource 1 - Information System</td>
<td></td>
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<tr>
<td>Resource 4 - Marketing Material</td>
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<tr>
<td>Resource 5 - Training Material</td>
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</tbody>
</table>
### Analysis and diagnosis

<table>
<thead>
<tr>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 - To define market segments</td>
</tr>
<tr>
<td>29 - To define customer requirements</td>
</tr>
</tbody>
</table>

#### Actor/recourses

- Role 19 - Sales Personnel
- Organizational Unit 6 - Customer Relations & Administration
- Organizational Unit 5 - IT Department
- Resource 1 - Information System

#### Rules

- Rule 1 - All Suggestions / complains should be taken seriously
- Rule 13 - Use only ethical methods and techniques to gather data
- Rule 25 - The obtained data should be stored in a repository
- Rule 28 - Tailor product range to each market

### Increasing the level of cross-functional cooperation

#### Goal

Through the change need the following goals are fulfilled:

- Goal 7 - To ensure „forefront” position in development of solutions around new technology
- Goal 16 - To have good understanding of new technologies
- Goal 17 - To ensure world class innovation processes
- Goal 18 - To accelerate investments in product development

#### Actor/recourses

- Organizational Unit 1 - The Case Company Marketing and Sales and Product Development department
- Organizational Unit 4 - Production Department

#### Rules

- Rule 5 - Update the Check list when new technologies for PD are available
- Rule 17 - The information must be acquired employing ethical methods
- Rule 19 - Product development projects shall not be accomplished within predevelopment prognosis
- Rule 23 - Every employee must have uniform definition of product quality

### Focusing on companies core competencies

#### Goal

Through the change need the following goals are fulfilled:

- Goal 19 - To maintain high share of customized products
- Goal 20 - To maintain broad product portfolio

#### Actor/recourses

- Role 2 - Marketing Director
- Role 3 - Product Development Director

#### Rules

- Rule 3 - Organize frequent training programs for developing employees competence

### Improving integration and functionality of the computer based Information System within the interface to meet internal customer requirements

#### Goal

Through the change need the following goals are fulfilled:

- Goal 9 - To initiate instant information access and collaboration within the company
Analysis and diagnosis

<table>
<thead>
<tr>
<th>Actor/recourses</th>
<th>Actors/resources needed to fulfil the goal:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role 1</td>
<td>Board of Directors</td>
</tr>
<tr>
<td>Role 2</td>
<td>Marketing Director</td>
</tr>
<tr>
<td>Role 3</td>
<td>Product Development Director</td>
</tr>
<tr>
<td>Role 4</td>
<td>Organizational Unit 5 - IT Department</td>
</tr>
<tr>
<td>Role 5</td>
<td>All system users</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rules</th>
<th>Rules that regulates or governs:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule 1</td>
<td>Rule 7 - Business manager that bears responsibility for state the needs, prioritize and realize expected results</td>
</tr>
<tr>
<td>Rule 2</td>
<td>Rule 8 - Use of the Information system and the information should be encouraged</td>
</tr>
<tr>
<td>Rule 3</td>
<td>Rule 9 - The Board of Directors makes the final decisions concerning IS/IT investments</td>
</tr>
<tr>
<td>Rule 4</td>
<td>Rule 11 - Only IT solutions that are affordable should be used</td>
</tr>
<tr>
<td>Rule 5</td>
<td>Rule 12 - IT initiative shall always be evaluated based on profitability from a business standpoint</td>
</tr>
<tr>
<td>Rule 6</td>
<td>Rule 25 - The investment must be made within the department’s budget</td>
</tr>
</tbody>
</table>

Increasing control over the workflow

<table>
<thead>
<tr>
<th>Goal</th>
<th>Through the change need the following goals are fulfilled:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal 1</td>
<td>Goal 41 - To map the organizational processes with outlining content and relations between different activities</td>
</tr>
<tr>
<td>Goal 2</td>
<td>Goal 42 - To introduce uniform standards</td>
</tr>
<tr>
<td>Goal 3</td>
<td>Goal 43 - To give immediate feedback of the employees work results</td>
</tr>
<tr>
<td>Goal 4</td>
<td>Goal 45 - To clearly articulate and share goals across the organization</td>
</tr>
</tbody>
</table>

Increasing the involvement of the product development function in development of marketing and training materials

The change need 1 was chosen due to its importance for the studied interface. Through increased involvement of the product development function in development of the marketing and training materials several cross-functional integration barriers (explained in details in Section 5.2.3) can be overcome. As shown in previous section at present the involvement of the PD function in preparing marketing campaigns is nonexistent. In this relation it is understandable how important are Process 4 and Process 6 of the BPM for transferring information concerning all new product’ features, product applications, and installa-
Analysis and diagnosis

tion, customer benefits and so on. The involvement can be realized to a great extent by increasing the levels of interaction by the means of structured and formalized meetings and increased documentation flow in the form of reports between the studied departments. Consequently, through enhanced communication, involvement of the product development function in preparing training materials (Table 2.2) will be realized. Thus, by increasing the level of interaction and communication, the change need 1 is expected to increase the integration within the studied interface (Tang, 2000; Maltz et al., 2001; Moenaert et al., 1994).

Through coupling the efforts of the marketing and product development functions product information to be conveyed to customers will be more accurate and precise. This argument is supported by Gupta et al. (1985). Moreover, the authors of the thesis believe that time will be saved since communication occasions between the Marketing Support Manager with the responsible Product Manager concerning the articulation of the complex technical terms will be reduced to minimum. This argument is supported by Parry and Song (1993).

**Increasing the involvement of the marketing function in the product development process**

The change need 2 was chosen due to its importance for overcoming several barriers for cross-functional integration. This change need corresponds to the problem concerning the optimal level of integration of the marketing function within the product development process. As concluded in the previous section the involvement of the marketing function in the product development process is low. The marketing function is limited to preparing marketing campaigns. The most prevailing problem is lack of involvement of the marketing function during the idea generation. Therefore, there is a need to undertake several measures in order to increase the involvement of the marketing function during all stages of the product development process, especially during the idea generation phase.

The involvement of the marketing function can be realized through increasing the levels of interactions. It will be beneficial for the Case Company to emphasize on structured and formalized way of organizing meetings conducted between the marketing and product development function during the PD process. Thus, the interactions between the functions will not only be in the form of face-to-face communication (Section 4.1 & Section 4.2). Further, through formalized meetings the problem concerning potential information losses between the studied departments will be solved. In addition, formalized meetings solve problem concerning lack of structured and coordinated activities between marketing and product development functions. The authors argue that more formalized procedures will benefit involvement of the marketing function within product development function. It is suggested for the CCPS to include policies and rules covering not only the product development, but also the marketing function. Thus, the responsibilities will be well-defined and clear. This suggestion is supported by Kahn (1996). Further, involvement of the marketing function in the product development process can be achieved through increasing the level of collaboration. This can be achieved through organizing social networking activities (informal group events, trips). These activities foster transfer of information between the studied functions. Moreover, the decision-making process within a function is supported since it is easier for employees to locate the needed expertise, and hence solve problems in a faster manner (Leenders & Wierenga, 2001). Increased collaboration between the studied departments will assist in overcoming barrier associated with contradictory opinions of the Directors of the M&S and PD departments concerning the responsibilities of the other function (Massey and Kyriazis, 2006). In addition, increased levels of collaboration will
help reduce the inter-functional rivalry between the functions (Awad & Chaziri, 2004; Massey & Kyriazis, 2006; Parry & Song, 1993).

**Increasing the level of cross-functional cooperation**
The change need 3 was chosen since high level of cooperation between the M&S and PD department will lead to elimination of several barriers. It is expected that this change need will help the functions to understand and recognize the other function’s efforts. This is in line with Massey and Kyriazis (2006). Increased level of cooperation will lower the level of inter-functional rivalry, which in turn will increase the level of perceived quality of information (Maltz et al., 2001). High levels of perceived quality of the delivered information will have a positive influence on the “instrumental” and “conceptual” use of information within the studied departments. In this way it will be assured that the information will not only be transferred between the departments but also used during the new product development process. The mechanisms to improve the cooperation are coordinating groups. To the responsibilities of coordinating groups belongs monitoring of the cross-functional product development process. Employees who are involved in the coordinating groups are trained in the professional language used by the other function. This means that they are familiar with the technical and marketing terms and play a role of translators for their own function. Thus, the language barrier is overcome. Further, it is important the degree to which the employees from the M&S and PD department are encouraged to interact in non-working related settings. These informal settings promote environment which fosters development of friendships and understanding of others personalities, clarifying work-related issues during these informal meetings, which in turn reduce the inter-functional rivalry (Moenaert et al., 1994).

**Focusing on companies core competencies**
The change need 4 is important for integration of the M&S and PD departments. It is crucial for overcoming barrier of ambiguous definition of the concept of product quality which is a subject to constant debates between the employees within the interface. Moreover, this change need aims at stressing the organizational-wide values which in turn will alleviate the inter-functional rivalry between the M&S and PD functions arisen from the differences in goals and objectives of the both functions. The marketing function is concerned with short-term objectives (M&S department prefers to have product that are easy to sell and have big sells immediately). Conversely, PD function has long-term orientation. The problem is related to the cultural differences between the functions (Leenders & Wierenga, 2001). Moreover, this change need requires increased collaboration, which implies availability of network that incorporates electronic interface (Kahn, 1996).

Further, the change need requires a clear articulation by the top management organizational strategy and objectives. The top management needs to communicate organizational policies and corporate values in an understandable way. Further, the top-bottom communication needs to be intensive and frequent. In addition, company business strategy needs to be clearly stated and communicated to both marketing and product development functions. It is also clear the fact that marketing and product development focus on different elements of the company’s mission but they need to have mutual understanding and share the same perspective of the business.

**Improving integration and functionality of the computer based Information System within the interface to meet internal customer requirements**
The change need 5 corresponds to several barriers for integration. First barrier is concerned with the fact that the departments use computer based Information Systems characterized by a very low level of integration. One problem is lack of common database which
leads to duplications of information and performed tasks. Further, as a problem is perceived the fact that the benefits from the intranet are not fully utilized since the intranet is used only within the function but not between functions. Further, there are no mechanisms that allow the company to capture and store tacit knowledge. In this relation, different definitions of the product quality are present at the Case Company. That is why, there is a need to codify and store the information concerning organizational routines, work practices, and concepts. Further, as a reason for low integration of the marketing and product development function is lack of mechanisms to gather and store the marketing information. In depth discussion concerning the initial vital functions of the IS is presented in Section 5.7.

**Increasing control over the workflow**

The change need 6 addresses issues concerning lack of immediate feedback of the employees' tasks results. Moreover, the difficulties experienced by the managers to assess the individual performance of employees can be overcome. Furthermore, this change need is associated with the concept of a process approach to quality. This implies that the work performed within the interface consists of interrelated chain of processes executed by employees that consumes inputs from process, transform them, and forward the output as an input to another process. (Lind & Goldhuhl, 2005). This change need helps to overcome barrier associated with lack of coordinative activities within the interface.

The authors of the thesis argue that through focusing on these six change needs the level of integration between the marketing and product development functions will increase. The proposed change needs 1,2,3,6 have process approach to quality since they imply that studied departments treat those that they serve as internal customers. Increased level of integration between the M&S and PD functions is anticipated to enhance understanding of the other function's needs and expectations, and subsequently to improve the quality of performed work. In addition, it can be said that these change needs try to direct employees' on-the job behaviour. This argument is supported by the fact that these change needs aim at manipulating formal and social aspects of the working environment (Section 2.2). This, in turn assures better quality of work performed within the studied departments and internal customer satisfaction.

The change need 4 aims at influencing the on-the job behavior through altering formal and social aspects of working setting (Porras & Robertson, 1992). Moreover, this change need tries to promote positive attitude of employees to one another. It is expected that in this way a favourable environment that contributes to mutual understanding of the employees will be created. It is believed that such an environment will contribute to higher motivation of the employees and subsequently maximize their satisfaction from performed work. In addition, it can be said that clearly communicated organisational values and a mission shared by everyone are important motivational factors. In relation to motivation issue, change need 6 is concerned with immediate feedback after tasks performed by employees' which is also perceived as motivational factor. The immediate feedback and clearly state organisational vision shared by everyone are prerequisites for better quality of the internal service processes and maximization of the employee satisfaction.

Change need 5 addresses the cross-functional communication issue. This change need aims at improving of the internal service quality through effective communication. This change need considers internal-customer satisfaction from two aspects. On the one hand employees are regarded as internal customers of the computer-based Information system and their requirements need to be met. Through meeting employees' requirements for informa-
tion it is expected that their commitment to the performed work will be greater. Moreover, the computer based IS will support employees’ decisions. Consequently, the authors of the thesis expect maximization of the internal customer satisfaction. On the other hand, the proposed change need has a process approach to quality. The improvement of integration and functionality of the computer based Information System is expected to lead to better integration of the M&S and PD functions, high levels of cross-functional collaboration and environment where certain information can be captured, transfer and store. In this way the work of the interface will be more effective and characterized with higher quality of internal customer service. As a result greater internal customer satisfaction is expected.

5.4 Actors and resources analysis

The actor and resource analysis allowed identification of individuals, organizational units, non-human resources, as well as roles pertinent to the interface between the M&S and PD departments and other actors of importance to the studied interface. The Actors and Resource Model was analyzed according to the change needs listed in Section 5.3, thus it describes actors that are target of changes or are responsible for carrying out these changes. This enabled to shorten the analysis by outlining only the crucial roles and tasks for each change need. The final actors and resource model is presented in the Appendix 3.

Increasing the involvement of the product development function in development of marketing materials

Important actors: Product Management, Project Management, Marketing Support, Sales personnel, Resource 1 – Information System Resource 4 – Marketing Material, Resource 5 – Training Material. Product Management (O. Unit 12) and Project Management (O. Unit 15) should actively participated in the process processes performed within the Marketing Support (O. Unit 7) which is responsible for creating marketing and training materials (Resource 4 and 5) for the Sale personnel (Role 19), as well ongoing training programs. Therefore, the unit has direct impact on the level of competences of the Sale personnel, which in turn impacts counselling provided to customers and the Case Company sales. A critical resource to increase the level of Sale personnel competences are the above mentioned training and sales materials.

Increasing the involvement of the marketing function in the product development process

Important actors: Sales personnel, Customer Relations & Administration, IT Department, Information System. Critical factor for achieving marketing orientation across the organization and thus maintaining the desired customer focus by the Case Company is a cross-functional communication between departments. Communication can be best realized by deployment of appropriate Information System (Resource 1), with cooperation of the functional units with the IT department (O. Unit 5). The system should enable gathering of marketing information by Sale personnel (Role 19), Customer Relations & Administration (O. Unit 6), and other actors, and enable instant access to the marketing information across the company.

Increasing the level of cross-functional cooperation

Important actors: The Case Company M&S and PD department, Production department, Suppliers. Achievement of this need requires integration between the Case Company the
M&S and PD interface (O. Unit 1), as well as close collaboration with the Production department (O. Unit 4) and suppliers (Role 5). The responsibility of the marketing function is to assist PD department to make decisions concerning implementation of new technologies into products in accordance to market readiness. In this relation PD department bears the responsibility for conducting research of new technologies and new applications. Based on close cooperation between M&S and PD departments the possibility for the Case Company to create successful solutions around new technology is higher.

Focusing on companies core competencies
Important actors: Marketing Director, Product Development Director. These actors are responsible for promoting company values. Thus both departments will have mutual understanding and share the same perspective on the business.

Improving integration and functionality of the computer based Information System within the interface to meet internal customer requirements
Important actors: Board of Directors, Marketing Director, Product Development Director, IT Department, all system users. The Marketing Director (Role 2) and Product Development director (Role 3) are responsible for stating the business requirements for Information Systems (Resource 1) to support work of their units. The IS influences directly work of the users, therefore improving system functionality calls for participation of all system users in the process of eliciting the requirements. Considering the fact that the investments in IS are left to the Directors and within functional units budget they are underestimated. Therefore the Board of Directors (Role 1) must encourage the investments and ensure proper allocation of resources. IT department (O. Unit 5) plays a coordinative role to ensure fit of the distinctive investments with each other and company IS/IT architecture.

Increasing control over the workflow
Important actors: Board of Directors, Marketing Director, Product Development Director. Maximizing internal customer satisfaction requires creation of environment which recognizes the user needs and fosters motivation. Consequently the Board of Directors and Directors of functional units need focus on formalizing the communication to help employees find the right expertise, give instant feedback, understand the goals etc.

5.5 Rule analysis
The Business Rules Model describes various limitations as to implementation of goals, as well as guidelines for actors concerning how to perform certain tasks.. The final version of the Business Rules Model can be found in Attachment 3.

Rule 1 – All Suggestions / complains should be taken seriously
The rule supports the goal to support decisions made in the PD department concerning development of future products (Goal 6). The actors involved in this process are members of the product development team, Marketing and Sales Director (Role 2), PD Director (Role 3). This rule should play a major role in incorporating marketing information into new product development process.

Rule 2 – The Sales staff must be trained about new products features before their launch
The rule supports the goal to train the Sale staff (Goal 19). The actors involved include Marketing Support Teams (Role 8) supervised by Marketing Support Manager (Role 7) and Sales personnel (Role 19). The rule has direct impact on the quality of counselling provided to external customers and impacts the Case Company sales.
Rule 3 – Organize frequent training programs for developing employees’ competence
The rule supports the goal to leverage the Case Company size and competences (Goal 8). The actors involved are all employees of the Case Company. The rule has impact on mutual understanding of the company business, interpersonal communication, and collaboration.

Rule 7 – Business manager bears responsibility to state the needs, prioritize, and realize expected results
The rule hinders the goal to transform business requirements into cost efficient, value adding IT solutions and providing service according to customer needs (Goal 39). It affects directors of every unit in the Case Company. The rule can have negative impact on the Case Company considering the fact that the Directors of respective organizational units are specialists in their own fields and can lack the knowledge required to define requirements for the IS.

Rule 8 – Use of the IS and the information should be encouraged
The rule supports the goal to initiate instant information access and collaboration within the company (Goal 9). The actors involved include all employees of the Case Company. The rule affects the level of information sharing amongst different organizational units.

Rule 9 – The Board of Directors makes the final decisions concerning IS/IT investments
The rule hinders goals to review the specification of the existing IT system and to implement new IT solution to support the overall business direction (Goal 22 and 21). The actors involved include members of the Board of Directors. The rule introduces strict control over the IS/IT investments, therefore can have impact on pursuing new investment efforts.

Rule 11 – Only IT solutions that are affordable should be used
The rule with aggregation with Rule 9 and 25 hinders achievement of goal to review the specification of the existing IT system and to implement new IT solution to support the overall business direction (Goal 22 and 21). The actors involved include members of the Board of Directors, Directors of the functional units. The rule limits the organization to implement solutions considered as being affordable.

Rule 12 – IT initiative shall always be evaluated based on profitability from a business standpoint
The rule with aggregation with Rule 9 hinders achievement of goal to review the specification of the existing IT system and to implement new IT solution to support the overall business direction (Goal 22 and 21). The actors involved include members of the Board of Directors, Directors of the functional units. The rule limits development of company IS/IT to capabilities of the investment pursuers to present potential business benefits of the investment to the Board.

Rule 13 – Use only ethical methods and techniques to gather data
The rule hinders achievement of goals to conduct frequent face-to-face interviews with customers and to conduct surveys and interviews with non-customers (Goal 50 and 51). The rule influences the work of the M&S department (O. Unit 2). Execution of this rule affects public image of the Case Company.

Rule 14 – The efficiency of a campaign shall be evaluated based on product sales
The rule supports goal to measure marketing options to help determine the efficiency of marketing campaigns (Goal 25). The rule affects actors in the Marketing Support and Sales
Offices (O. Unit 7 and 25). The rule affects utilization of resources for marketing purposes, ensuring that the resources are distributed accordingly to the effectiveness of campaigns.

**Rule 16** – The company shall have uniform standards for handling information and material
The rule supports goal to introduce uniform standards and procedures (Goal 42). It involves all the actors in the Case Company. It directly affects organizational performance through better coordination and control over organizational processes.

**Rule 25** – The obtained data should be stored in a repository
The rule supports the goal to support the decisions made in the PD department concerning development of new products (Goal 8) and is concerned with the market information. The rule affects work of all the employees in the M&S department. It has the potential to influence the direction of future new product development projects, by providing information concerning demands of customers at different markets.

**Rule 26** – The marketing material should emphasize unique features of a product and benefits for the customer
The rule supports goal to emphasize in marketing materials unique features of product and its benefits to the customer (Goal 12). The rule involves actors involved in the Marketing Support – Marketing Support Manager and Marketing Support Teams (Role 7 and 8). The rule emphasizes the content and focus of the marketing material.

**Rule 28** – Tailor product range to each market
The rule supports the goal to define market segments (Goal 28). The actors involve include all actors in the interface between M&S and PD department. The rule affects the number of products aimed at the Case Company markets.

**Rule 29** – The investment must be made within the department’s budget
The rule with aggregation with Rule 9 and 11 hinders achievement of goal to review the specification of the existing IT system and to implement new IT solution to support the overall business direction (Goal 22 and 21). The actors involved include members of the, Directors of the functional units. The rule limits the Directors of departments to purchase IS solutions within the internal departmental budget.

**5.6 Concept analysis**

This section evaluates the concepts that are pertinent throughout the interface between M&S and PD department at the Case Company. The Concepts Model assisted in laying foundations to create a unified business language. The role of the CM for the analysis is low and focused solely on clarification of concepts that appeared in other models. The final version of the CM can be found in Attachment 3.

The developed model represents only the general concepts pertinent to the interface between departments under investigation. In order to increase readability of the model the most important relations between models were illustrated. The Case Company Headquarters (HQ) (Concept 1) are the central, most important concept of the model, because it’s the place where all the initiatives have their roots. The Case Company HQ consists of various organizational structures such as M&S department (Concept 5), IT department (Concept 4), Manufacturing department (Concept 2), or PD department (Concept 3), each supervised by the Board of Directors (Concept 72). In Case Company HQ work various employees (Concept 6), which can be divided by the organizational unit they belong to. De-
developed concept model depicts only the employees involved in the work of units under investigation, namely M&S staff (Concept 59) and PD staff (Concept 58). The staff is responsible for performing various organizational tasks which aim at serving the customers (Concept 28) and fulfilling customer requirements (31). The customer is either an internal (Concept 29) or external (Concept 30) customer.

The PD department (Concept 3) is responsible for running product development projects (Concept 9), which result in products (Concept 16). Products can belong either to a standard line (Concept 24) or be customized accordingly to special requirements of a customer (Concept 23). The project starts with a product idea (Concept 32) which can be either internal (Concept 33) or external (Concept 34). Internal product idea originates within the company, and external idea has its roots in input of company’s stakeholders. Besides the customer requirements the product idea is also influenced by technology (Concept 45). The product development project is a process (Concept 19) that is controlled by a Steering Group unique to every project (Concept 18), responsible for solving PD problems (Concept 73), and is governed by the Case Company Project System (CCPS) (Concept 20). The CCPS is defined as a set of rules (Concept 25), guideline (Concept 26), and protocols (Concept 27). The final product is defined by its quality (Concept 17) and evaluated based on meeting predevelopment prognosis (Concept 50). These define resources (Concept 52) within which the project must be completed namely: financial (Concept 53), human (Concept 54), infrastructure (Concept 55) and time (Concept 56). Not all resources are under control of the project team. Accomplishment of a product development process besides PD department requires participation of other departments and, therefore is out of control of the project team. An example can be Manufacturing department (Concept 2), which is responsible for production of initial product samples (Concept 74), 0 series (Concept 75), and 1 series (Concept 76) among others. Its production capabilities are limited by availability of raw material (Concept 42), which in turn are delivered by suppliers (Concept 43) after placing an order by purchasers (Concept 44).

The role of the M&S department (Concept 5) in the product development process has a supporting character. Based on the various outputs of the product development process the unit prepares training material (Concept 51) for the Sales staff, marketing materials (Concept 12), as well as the overall marketing campaign (Concept 13). The necessary information for the department includes products specification (Concept 46), products description (Concept 47), products tests results (Concept 48) and product shots (Concept 49).

5.7 Initial vital functions of a computer based Information System

Throughout this section the authors answered RQ3 concerned with the initial vital functions of computer based Information System/-s necessary for high level of integration and enhancement of information flows within the studied interface at the Case Company.

Based on the analysis of the interface and literature review initial Information System requirements has been proposed. These requirements are depicted in form of a Technical Components and Requirements Model (TCRM). The model is part of the EKD method, and therefore was created in accordance to modeling guidelines defined by Bubenko et al. (2001). This implies focusing on needs of actors within the interface to satisfy both existing and planned processes and goals. Final version of the developed model can be found in Attachment 3. In order to facilitate understanding of the model the authors decided to divide
its textual description into four parts. The first part deals with general goals and requirements of the system, whereas the three following parts are its extensions.

**General goals and requirements**

The most general goal of the IS is to equip the company with new sources of creating competitive advantage (IS Goal 1). This is due to the fact that competitive advantage is an important factor to ensure sustainable growth of any organization (Gupta & Rogers, 1991), and therefore is in line with Goal 1 of the GM. As mentioned in Section 2.4.1 IS and IT can contribute to creation of competitive advantage through automation of processes, creating unique products and services, rising barriers to entry, enhancing and differentiating products and services (Oz, 2004). Gaining and sustaining competitive advantage is possible through information efficiencies and information synergies possible to achieve thanks to IS/IT implementation (Dewett & Jones, 2001). Consequently, the goals of the Information System are to enable information efficiencies and information synergies throughout the interface between the M&S and PD department (IS Goal 3 & 4). Information efficiencies and synergies at the Case Company are important from the perspective of optimizing processes in terms of resource consumption, as well as achievement of several organizational goals for e.g. Goal 5, 6, 8, 36 or 45 of the GM.

Close examination of Goal 3 and 4 of the GM allowed the authors to derive two additional IS goals both with high importance to create new sources of competitive advantage. First of all the system should be scalable to the size of the company and changing operations volume (IS Goal 2), which is motivated by Goal 3 of the GM to deliver double digit growth and profitability. Scalability can be achieved through modular architecture of the system (Lipson, 2007), depicted as IS functional requirement 1 (IS Freq 1) in the TCRM. This can be achieved for instance by using Enterprise Application Integration (EAI) systems mentioned in Section 2.3.2.1 (Kroenke, 2009). However, in order to ensure cost savings the system must allow integration with the current IT infrastructure (IS Freq 2). In turn it will facilitate company expansion on new markets through acquisition by easing incorporation of acquired businesses into the Case Company structures (IS Problem 1). This view is in line with Ashkenas et al. (1998). Second of all the system should allow flexible adaptation to changes in the external environment of the company (IS Goal 5), which is motivated by Goal 4 of the GM to maintain and ensure harmonious internal structure of operations (Gulati, 2007). This demand on the IS to allow managing the application portfolio in accordance to current business needs (Weill et al., 2002; Jacobs & Holten, 1995). Adjustments to new conditions should be fast and most of all undertaken with minimum cost, which can be seen as constrain to IS Goal 5, and therefore has been depicted as none-functional requirement 1 (IS NFReq 1).

In reference to the above mentioned IS Goal 3 and 4, information efficiencies and synergies are required to support decisions made by individuals and teams irrespective to whether they are functional or cross-functional. This was depicted as IS Goal 6. In addition the IS should assist in problem solving (IS Req 1).

In order to support decisions made within the interface between the M&S and PD department (IS Goal 6), as well as to foster problem solving fulfillment of several interrelated goals is required. These goals are formulated based on Laudon and Laudon (2006) reasoning, which advocates that improvements in decision making process can be achieved through integration of processes, fostering collaboration and managing organizational knowledge. Therefore, the authors of this thesis depicted it as IS Goal 7, 8 and 9. Furthermore, these goals have been motivated by the goals and other components of the GM to emphasize their importance in realization of organizational strategy and solving problems
faced by the Case Company. All together the above mentioned goals aim at increasing involvement of the marketing function in the product development process, therefore to solve Problem 2 of the GM. More specifically, IS Goal 7 – to integrate processes within one IT solution – has been related to Goal 56 of the GM to integrate all procedures: no handling of information manually. As a consequence the integration of organizational processes is expected to solve Problem 8 concerned with different work practices undertaken in different branches of the Case Company (Leenders & Wierenga, 2001; Parry & Song, 1993). IS Goal 8 and 9 have been motivated by Goal 8 of the GM which implies leveraging company size and competences. This is relevant since achievement of this organizational goal requires increased collaboration between employees (Tang, 2010; Kahn, 1996; Gupta et al., 1985) and utilization of organizational knowledge as a valuable asset (Dewett & Jones, 2001). In addition IS Goal 9 is motivated by Goals 41 and 47 of the GM, and it is in line with Opportunity 16 – to build external knowledge repository. These goals advocate mapping organizational processes and streamlining definitions across the organization (Parry & Song, 1993). As a consequence gathering, storing and sharing organizational knowledge is expected to solve Problem 4 connected with inconsistent definitions of the concept of product quality between different generations of employees. This reasoning can be backed by work of Nonaka (1991), Tolis (2005), and Osterwalder et al. (2005).

The above mentioned IS Goal 7, 8 and 9 will be used as a starting points to guide detailed analysis of the TCRM presented underneath.

Integration of processes
Integration of processes within one IT solution (IS Goal 7) calls not only for integration of organizational data but also for its dynamic and immediate flow. According to Motiwalla and Thompson (2009) these are the prerequisites to increase the accuracy of decision making process. Therefore the authors depicted it as IS Goal 10 and 11 of the TCRM. In addition these goals can be further motivated taking into consideration analysis conducted in the Case Company. Storing information within one database (IS Goal 11) is expected to eliminate several processes conducted within the studied interface, namely Process 4, 24 and 25. In this thread of thoughts the actors in the M&S department would get instant notification about product development project start up, instant updates on its progress, as well as ready input for production of marketing and training materials. Thus saving time and reducing potential errors. According to Kroenke’s (2009) reasoning the existing at the Case Company practices of sending documents through emails do not give organization control over the subject of collaboration, and can lead to multiple problems such as different versions of the same document, lost and forgotten messages, or errors arisen during entering the input from different files into one database. Furthermore, in addition to storing the data the IS should incorporate tools to analyze it, which is expressed as (IS Freq 5).

Analysis of the interface between the M&S and PD department revealed the need to store two types of data. The data associated with marketing information (IS Req 3) and the data pertinent to product development projects (IS Req 4). The chosen types of marketing data are motivated by the following goals of the GM: 15, 25, 27, 28 and 29, and are in line with arguments presents by Hart et al. (1999). Moreover, it has been identified that this marketing information is required by Process 3 and 7, which are associated with selection of product features, its specification or fit in the existing product portfolio. Vast amount of marketing information is expected to help base decisions made during the PD process on facts, which is among four basic cornerstones of the TQM philosophy (Bergman & Klefsjö, 2007). The desirable types of marketing information to be stored in the database include information concerning market segments (IS Freq 15), industry trends (IS Freq 16),
product opportunities (IS Freq 17), customer requirements (IS Freq 18), and efficiency of marketing campaigns (IS Freq 19). The choice of these types of information is facilitated by a study by Hart et al. (1999), who elicit basic taxonomy of marketing information. Apart of its supporting role in Process 3 and 7, this data can help in generation of product ideas through identification of new trends and product opportunities, as well as foster the work of the M&S department in suggesting optimal advertising channels for the marketing campaign (Moenaert et al., 1994). Therefore, fostering Process 6 and allowing the department to be cost efficient in turn eliminating Constraint 2 depicted in the GM.

Storing information concerning PD projects within one database (IS Req 4) is response to organizational Problem 9 concerned with integration of product information. The chosen types of data concerning PD projects are in turn motivated by Process 26 of the BPM, namely production of marketing materials. Moreover, it can be said that this information will aid achievement of Goal 57 of the GM, which advocates the need to compare performance of processes in terms of utilization of resources. The desirable types of PD information to be stored in the database include information concerning product specification (IS Freq 20), test results (IS Freq 21), product description (IS Freq 22), images (IS Freq 23), and documentation concerning course of the development process (IS Freq 24). The choice of these types of information is justified by current needs of the M&S department concerning production of marketing and training materials, as well as future goals of the Case Company.

In connection to IS Requirement 3 and 4 none-functional requirement was formulated, which emphasizes the need to store only quality information, pertinent to achieving organizational vision, mission and goals. This argument is in line with Turban et al. (2008).

Collaboration

In order to enable collaboration between employees (IS Goal 8) the system must meet several critical goals and requirements. First of all the system should allow creation of virtual workplace for every employee (IS Req 2). In case of the studied interface additional requirement can be derived observing the character of work performed in both departments. Majority of processes require participation of teams both functional and cross-functional, therefore the IS must enable flexible composition of teams according to changing needs and phases of the project. This was depicted as supporting functional requirement 3 (IS Freq 3) of the TCRM.

According to Kroenke (2009), in order for collaboration to be effective, the system must address three critical factors. These factors were used by authors of this thesis to formulate set of supportive goals. That is to say the IS must enable content management (IS Goal 12), control over workflows (IS Goal 13) and improvement of communication between employees (IS Goal 14). The above mentioned goals can also be motivated by Goal 36 of the GM – to deliver on time the right product quality. This reasoning is backed by Tang (2010), who advocates the role of collaboration in reducing the lead times for new products and services.

In relation to content management (IS Goal 12) the system should enable multiple documents (IS Freq 7) and document version management (IS Freq 6). During the course of the PD at the Case Company many documents describing phases of the PD process are created, therefore the above mentioned functional requirements are desirable. In connection to document version management the system should allow tracking employees contribution and work progress (IS Freq 25), and additionally enable the managers to give feedback to employees after completed work (IS Freq 28). Overall the above mentioned func-
tional requirements connected to content management are expected to solve difficulties experienced by managers to evaluate individual performance of employees.

Workflow control refers to supervision of tasks performed by employees. Therefore, the role of the Information System should be to automate control over work. Consequently as stated by Kroenke (2009) and Dewett and Jones (2001) the system will reduce involvement of management in execution of the workflows and at the same time maximize control over the work progress. The authors depicted it as functional requirement 9 (IS Freq 9). Automation of workflow in turn forces on the system another functional requirement, namely the ability to send instant messages to update both managers and employees with progress in the sequence of performed activities (IS Freq 27). Finally the team based character of work performed within the interface requires ability of the system to enable performing task in parallel (IS Freq 8).

As mentioned in Section 2.1.3 product development process in order to held fruitful results requires great amount of communication between employees and organizational units (Massey & Kyriazis, 2006; Maltz et al., 2001). Improving communication between employees at the Case Company is vital to alleviate barriers arisen as a result of running operations in 17 different countries. The communication tools however need to be available for every employee, which is depicted as IS requirement 7. Considering basic two types communication, the system should incorporate both synchronous and asynchronous tools and applications (IS Req 5 and 6) (Kroenke, 2009). The desirable types of applications to support synchronous communication at the Case Company are multiparty text chats, conference calls and videoconferencing. Conference calls and videoconferencing is especially desirable considering the work of the Assortment Council (AC). Every year meeting can be supported by more frequent virtual meetings with pre-set agenda to fulfill expectations of the AC as to greater level of needed formalization (Section 4.2). The desirable asynchronous tools and applications include ordinary emails, discussion forums, and tools for conducting surveys. Emails are currently widely used within the Case Company, use of forums however needs wider support. The most beneficial in light of designated goals are online surveys, which will help to gather information towards recognition of employees’ attitudes and opinions, thus supporting Goal 44 of the GM.

Knowledge Management
Gathering, capturing and storing the knowledge is important from perspective of alleviating difficulties in managing this organizational asset in many distant locations. It is important to capture the tacit knowledge and make it explicit to all employees in the organization, to help share best practices, facilitate acquisition of knowledge (Pearson & Saunders, 2006), and thus alleviate negative effects of running the business in dispersed locations (Constraint 7). In connection to that arise a need for the gathered knowledge in the system to be available instantly using web based tools expressed as IS functional requirement 4 (IS Freq 4) (Turban et al., 2008). This requirement can be further motivated by Goal 9 of the GM, which promotes initiation of instant access to information and collaboration within the company.

Analysis of the present situation at the Case Company revealed several sub-goals for building knowledge management system. First goal is closely related to Goal 16 of the GM, which aims to have good understanding of new technologies. Therefore, the system must help in sharing information concerning new technologies (IS Goal 15). More specifically, it should allow to communicate and discuss new technologies (IS Freq 10). This is in line with cross-functional view on knowledge management recommended by Dewett and Jones (2001). Moreover, as articulated by Kroenke (2009) it can increase the level of innovative-
ness in the organization by promoting free flow of ideas. Access to the system should be
granted to all employees within the studied interface to help accumulate their knowledge
and generate new product ideas (IS Freq 35). In addition the system should incorporate
tools allowing capturing and visualizing abstract ideas to help in presentation of the prod-
uct idea (IS Freq 34). Conceptualization of the product idea at early stages of the product
development process can help the Assortment Council to make informed decision regard-
less project acceptance or rejection, and therefore is of great importance.

Second goal for the knowledge management system is required from the standpoint of
Process 22 and 23 of the BPM, concerned with evaluation of the product development
project. It advocates storing documents concerning course of the CCPS PD projects, and
therefore can give the evaluators frame of references to other projects, as well as to help in
realization of Goal 41 of the GM, that is mapping organizational processes with outlining
content and relations between different activities. Additional desirable feature of the system
is storing a list of encountered problems and measures taken to solve them for every
project (IS Freq 12), consequently allowing employees to find potential solutions to ongo-
ing PD projects. To maximize the usage of the repository implementation of simple search
engine by problem and product line is advantageous (Baeza-Yates & Riberio-Neto, 1999).
The authors depicted it as IS functional requirement 36 (IS Freq 36). Last but not the least
the database should be subject to frequent updates in order to ensure the quality of inform-
ation (IS Freq 11) (Turban et al., 2008).

Third goal had direct connection to problem solving both during the product development
process and during routine work tasks. This goal emphasizes the need to have directory
about employees’ competences and expertise. The authors depicted it as IS Goal 17. The
origins of this goal can be traced to the work of Dewett and Jones (2001), who emphasize
close correlation between problem identification and problem solving thanks to application
of expert systems. Directories concerning employees’ competences and expertise reduce
barriers created by weak connections between units and lack of social acquaintances, there-
fore giving employees possibility to explore new previously unknown sources of expertise.
In connection to the present situation at the studied interface problem encountered during
each phase of the product development process are reported to the Steering Group, which
is accountable for solving them. As the investigation revealed the queries are handled at the
end of every phase. Consequently, it can lead to potential delays in the PD process. Thus
appear the role of directories which in connection with previously mentioned communica-
tion tools and applications can help to find the right person in the organization to solve aris-
en problems. However, as advocated throughout the literature information in the system
must be up to date (Turban et al., 2008). The authors of this thesis depicted it as IS func-
tional requirement 13, and in connection to the previous statement additional requirement
to authorize employees to update their profiles was formulated (IS Freq 37). Finally, in or-
der to ensure utilization of the system it must be easy to use and access the information
(Yeo, 2002). Therefore, implementation of a simple search engine by name, department,
type of product and technology is desirable (IS Freq 14) (Baeza-Yates & Riberio-Neto,
1999).
6 Discussion and conclusions

This chapter presents general conclusions drawn based on the analysis conducted in the Chapter 5. Furthermore, this chapter includes brief discussion concerning applicability of the findings to other companies operating in similar environment and industry. In addition, future research recommendations will be given, as well as strengths and weaknesses of this thesis will be pointed.

In relation to the RQ1 the analyses show that the current integration between the Marketing and Sales (M&S) and Product Development (PD) departments at the Case Company is low. Marketing function is not involved in discovering new product opportunities. The investigation revealed several root causes of this state on nature, in form of barriers to cross-functional integration.

It can be concluded that the product development process follows phases described in the literature by Gupta et al. (1985), Ulrich and Eppinger (2008), and Bergman and Klefsjö (2007). However, the cross-functional integration, specifically the involvement of the marketing function, does not correspond to the optimal level of integration recommended by the above mentioned authors. This is true since barriers to cross-functional integration were identified within the studied interface. First barrier is a low involvement of the marketing function in the product development process. As mentioned in Section 5.2.3 the marketing function is not involved in generation of ideas concerning development of new products. M&S responsibilities are limited to idea screening by one representative, namely the Director of the M&S department. The reasons for low involvement of the marketing function in the product development process can be traced to omissions of the department to gather and store the marketing information. Furthermore, the authors concluded that low frequency of meetings (International Company Meetings conducted once a year), and unstructured way of conducting them hinder achievement of desired customer focus. From the above it is clear that the department does not have any valuable input that could be used in the PD process. Another barrier for a cross-functional integration identified within the interface is lack of mutual understanding and recognition of other function's efforts. This barrier originates from contradictory opinions of the Directors of the M&S and PD departments concerning the involvement of the marketing function in generation of the product idea. Furthermore, the integration between the M&S and PD functions is constrained by lack of formalized communication. A reason for informal communication is a close physical location of both departments. Informal communication results in lack of proper documentation of cross-functional meetings, thus the output of the meetings can be lost, and consequently lower the performance the interface. In addition the M&S and PD functions use computer based Information Systems with very low level of integration. There is no common database, therefore it leads to duplication of information, as well as overlapping work tasks. Consequently the overall performance of the interface is far from reaching its optimal level. Last but not the least, the involvement of the marketing function in the PD process is low since its main responsibilities are concerned with preparing the marketing campaigns. Conversely, the involvement of the PD function in preparing the marketing campaign is nonexistent.

In relation to the RQ2 six change needs, on the basis of analysis, were outlined. These change needs are as follows:
1. Increasing the involvement of the product development function in development of marketing and training materials
2. Increasing the involvement of the marketing function in the product development process
3. Increasing the level of cross-functional cooperation
4. Focusing on companies core competencies
5. Improving integration and functionality of the computer based Information System within the interface to meet internal customer requirements
6. Increasing control over the workflow

The authors argue that if the Case Company concentrates on these change needs the internal service quality of the M&S and PD departments will increase. As a result the internal customer satisfaction will be maximized.

In relation to RQ3 the analysis and diagnosis of the current business environment at the Case Company revealed several areas for future improvements. Changes can be made by implementing several changes measures in form of mechanisms for cross-functional integration. Realization of these change measures, however independent from existence of a computerized Information System, can be greatly enhanced by implementation of IS and IT. Ward and Peppard (2002) and Pearlson and Saunders (2009), among others, are researchers who support this statement. At present the existing computer based Information System supports neither business processes performed within the interface between the M&S and PD departments, nor achievement of organizational goals. Therefore, it is apparent that revision of the existing IS and/or implementation of new IS/IT solution is required.

Furthermore, the analysis and diagnosis made possible proposing initial vital functions of the system necessary to ensure high levels of integration, enhance information flows within the studied interface, and increase internal customer satisfaction. The critical goals of the IS has been identified as: enabling information synergies and efficiencies, scalability to changing operation volumes and flexible adaptation to changes in the external environment, as well as fostering decisions made within the interface. In addition, the system must integrate various types of marketing and product development information within one database; include a broad selection of tools to enable collaboration through better communication, workflow control, and content management. Last but not the least the system must allow managing organizational knowledge in the following categories: knowledge related to new technologies, knowledge related to product development projects, and directories about employees competences and expertise.

Based on the analysis, it can be concluded that procurement of a computer based Information System despite clearly stated requirements will be a challenge for the Case Company. The authors identified reluctance as to the implementation of a new IS by the M&S and PD department despite successful implementation of respective systems in other departments. The research revealed necessity for closer location of both departments, but at the same time the existing computer based IS has been evaluated as satisfactory. The unwillingness to implement new computer based IS and a positive opinion concerning hitherto existing system can be traced to company policies. According to it the departments need to found the IS investments from their own budgets, whereas high focus is put on cost efficient work. In addition in case of a system that spans across organizational functions agreement of all the departments is needed as to founding, functionality, and cost sharing.
Discussion and Conclusions

Thus, at first place these issues need to be further addressed by the Board of Directors at the Case Company.

The authors argue that the results associated with the specified RQs can be generalised, and implicated by the top management in companies which struggle with cross-functional integration. Moreover, the conclusions drawn from the RQ1 and RQ2 can be used to identify problems by the means of comparison. In addition, the change needs can be used to increase the understanding of the key areas for integration between the M&S and PD departments during PD process. Further, the answers to the first two RQs highlight the significance of the issues of internal service quality and internal customer satisfaction. Similarly the results obtained from the RQ3 can be used by executives during the process of planning IS/IT implementation. The proposed goals and requirements of the system emphasize the dominant trends in the IS development.

6.1 Method considerations and criticism of the thesis

The interface between the M&S and PD departments represents a complex environment characterized by many distinct variables. Therefore, it is very difficult to choose appropriate method for analysis. The method employed for the purposes of this research – the Enterprise Knowledge Development (EKD) – allowed the authors to investigate different facets of the studied interface. Nonetheless, due to massive amount of data obtained during the course of the research the authors frequently had to prioritize the importance of one aspect over another in order to avoid being overwhelmed with information. The authors believe that the prioritization of the depth of analysis is the key to increase the overall understand ability of the obtained results.

Moreover, it is worth to mention that during the course of the research the authors’ experienced difficulties while working with the respective organizational functions and organizational change agents at the Case Company. Despite active involvement of the change agents, in the business diagnosis, the involvement of the marketing and product development function was much lower than initially anticipated. Consequently, it made the investigation problematic and time consuming. The encountered situation suggests that prior to the business diagnosis it is recommended to ensure commitment of all parties under investigation. In turn the time needed to gather data will be reduced, obtained results will better reflect the reality, and the proposed solutions easy to implement. Moreover, the authors suspect that lack of interest of the M&S and PD will further hinder execution of proposed change needs by the change agents.

As mentioned the involvement of the M&S and PD function in the research was lower than initially anticipated. Therefore, the authors had to accordingly adjust chosen methods to changing circumstances. In turn the initial plans to conduct questionnaires with all the employees within the interface had to be abandoned. The reason for that was lack of time of the employees to answer the questionnaires. Consequently, the authors obtained only internal secondary data in form of organizational documents, as well as primary data by the means of semi-structured interviews and observations. The interviews were conducted only with high level management within the interface, thus the thesis does not allow for comparison of both top managerial and bottom line perspectives on diverse phenomena. The obtained data however was in depth and fully satisfied the authors’ needs.
Another weakness is a subsequent result of low involvement of the M&S and PD function in the research. Full potential of the EKD method employed for purposes of answering the RQs can be realized only by active involvement of the problem owners in the modelling process. The circumstances however forced the authors to employ consultative approach, which implies development of models based on delivered information and then checking their consistency and obtaining approval by the problem owners. This not only increased the time needed to develop the respective models, but also made impossible for the Case Company to harvest all benefits of the business modelling.

Nonetheless, the EKD method utilized for the analysis and diagnosis of the interface between the M&S and PD department allowed for comprehensive description of different organizational facets. Therefore, it made possible in depth analysis of the current state of integration between the M&S ad PD departments. These analyses permitted to trace the root causes of problems arisen within the interface, as well as to point out areas central to future improvements.

Last but not the least, the EKD method is a mean used to elicit initial business requirements for an Information System to be developed. Consequently, the authors were able to answer all the RQs using one comprehensive method. Moreover, it is worth to mention that the process of eliciting the business requirements for an IS was conducted with close alignment of the system functionality with the actual business needs. This is a widely recognized prerequisite for future success of one’s investment.

### 6.2 Future research

Considering the fact that at present the Case Company does not have any external repository of organizational knowledge and faces problems with communicating and prioritizing business goals the models created in the course of the business analysis and diagnosis can be used by the company to promote concepts of knowledge gathering, storing and sharing. This will help to prepare employees for inevitable implementation of more advanced knowledge management system.

As a result of conducted diagnosis and analysis the authors proposed initial vital functions of a computer based Information System to enhance integration and information flows within the M&S and PD interface. The obtained results focus on present and future needs of both departments, however it is necessary to note that the business environment is characterized by high degree of uncertainty and constant evolvement. Therefore, it is advised for the Case Company to continue modelling activities on a regular basis. High degree of interrelation between models will help to trace changes across the interface and accordingly adjust every component of the business to optimally face challenges created by the external environment and take advantages of arisen opportunities, by maintaining the IS functionality according to the actual business needs.

This thesis addresses mainly answer to questions concerning “what to change”, and “why to change it”. Therefore, there is a need, for the Case Company, to further investigate “how” the proposed change needs can be implemented. Consequently, deeper understanding of the mechanisms for integration is needed and evaluation of feasibility of the planned changes required.
REFERENCES

Books and Articles:


Dubé, L., & Paré, G. (2003)”Rigor in Information Systems positivist case research: current practices, trends, and recommendations1”, MIS Quarterly Vol. 27, No. 4, pp. 597-635


References

Williamson, K., (2002), “Research methods for students, academics and professionals”, Centre for Information Studies, Charles Sturt University, Wagga Wagga


Web sources:


Case Company documents:

Case Company. (2010). Organisational structure – Marketing department. - (2)
Case Company. (2010). Employees’ responsibilities – PD department. - (4)
Case Company. (2010). Organisational structure – Marketing department. - (5)
Case Company. (2010). Integration of IS [Presentation]. – (7)
Case Company. (2010). IT strategic orientation [Presentation].- (8)
Case Company. (2010). Marketing and Sales department [Presentation].- (9)
Case Company. (2010). Enabling Business Values and Profitable IT. - (10)
Appendices

Attachment 1 - The interview questions

Questions for the Director of the Marketing and Sales department

Goals
1) What are the main responsibilities of your department?
2) What is the primary strategy of the M&S department?
2) What are the goals of your department?
3) Are there any particular opportunities one could use for the achievement of the goals?

Rules
4) According to what rules and guidelines M&S department at the Case Company performs its tasks?
5) What quality standards are used within the department?
6) Are you satisfied with the existing rules?

Actors
7) How many employees are there in your department?
8) What is the organizational structure of the M&S department?
9) What are the responsibilities of the employees within the department?

Processes
10) How the interaction between the M&S and PD departments is realized?
11) How the marketing function is involved within the PD process?
12) For what activities and decisions the M&S department is responsible?
13) Which are the main processes in your department?
14) How are these processes related?
15) Why is this process needed?

Communication
16) Are the interactions between the M&S and PD departments formalized?
17) How the information exchanged between the departments is stored?
18) What are the most common communication channels used within the M&S and PD interface?
19) How is the communication process between the dispersed Sales Offices realized?
20) How would you describe the level of satisfaction from the communication between the M&S and PD?
21) What is the frequency of interaction between the M&S and PD departments?
22) Do you feel satisfied with the current state of information exchanged between the M&S and PD departments?

Others
23) How well do you know the people in other department?
24) Are there any serious problems arising between the M&S and PD departments?
25) How do you measure the performance of the employees?

Questions for the Director of the Product Development department

Goals
1) What is the primary strategy of the PD department?
2) What are the goals of your department?
3) Are there any particular opportunities one could use for the achievement of the goals?

Rules
4) According to what rules and guidelines PD department perform its tasks?
5) What quality standards are used within the department?
6) Are you satisfied with the existing rules?
7) How the performance of the PD process is gauged?

Actors
8) How many employees are there in your department?
9) What is the organizational structure of the M&S department?
10) What are the responsibilities of the employees within the department?

Processes
11) For which activities and decisions the PD department is responsible?
12) Which are the main processes in your department?
13) How are these processes related?
14) Why is this process needed?
15) To what extent marketing function participates in the PD process?
16) Do you feel satisfied with the present interaction between the M&S and PD departments?
17) Do you have any procedure for problem solving?

Communication
18) Are the interactions between the M&S and PD departments formalized?
19) How well do you know the people in other department?
20) What is the frequency of interaction between the M&S and PD departments?
21) What are the most common communication channels used within the M&S and PD interface?
22) How the information exchanged between the departments is stored?
23) How would you describe the level of satisfaction from the communication between the M&S and PD?
24) Are you satisfied with the current state of information exchanged between the M&S and PD departments?

Others
Appendices

25) Are there any serious problems arising between the M&S and PD departments?
26) How do you measure the performance of the employees?
27) How the product quality can be defined?

Questions for the Marketing Support Manager

General information
1) What are your responsibilities within the department?
2) What are the subsequent positions in the M&S and PD departments that need the outcome of your work?
3) From where do you get input to perform your tasks?
4) When marketing function is involved within the PD process?

Goals
5) What are the goals of your organizational unit?
6) Does your organizational unit have performance measures to gauge the achievement of the goals?

Communication
7) What is the frequency of interactions between the M&S and PD departments?
8) What are the most common communication channels between your organizational unit and the PD department?
9) Are the interactions between your unit and the PD department formalized?
10) What is your perception on the information you receive from the PD department?
11) Do you have any difficulties concerning the communication with the PD department?
12) Do you have any suggestions for the company to help improve performance and efficiency of your unit?
### Attachment 2 - The EKD method

Table 2.4 - Components and driving questions of the EKD models (Based on: Bubenko et al., 2001).

<table>
<thead>
<tr>
<th>Sub-models</th>
<th>Content /Critical Questions</th>
<th>Components</th>
</tr>
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</table>
| **Goals Model**     | GM is concerned with the goals of the company and its employees. Goals have to be formulated following principles of smart goal creation. Goals can be considered as driving factors and motives for components specified in the other sub-models. Examples include: | • Goals  
These are “a desired state of affairs that needs to be attained” (p.27); |
|                     | • What are goals/strategies of the company/part of an enterprise?  
• How these goals are prioritized?  
• What are the relations between the goals?  
• What issues hinder the achievement of the goals?  
• How a certain problem can be removed or its influence reduced?  
• What are the different alternatives for the fulfillment of the goals?  
• Which of the rules, policies from the outside world can be relevant to the model to be developed?  
• Which opportunities/strengths exist? | • Problems  
Factors that prevent from the goal achievement;  
• Causes  
These are reasons for the problems. The causes cannot be controlled by an organization;  
• Constraints  
Rules and laws from the external environment that influence the components and relations within an enterprise model;  
• Opportunities  
These are the factors that are able to ease the attainment of a certain goal, or to become new goals; |
| **Business Rules Model** | BRM focuses on the rules governing the organization, that limit or/and facilitate the process of goals attainment. Examples include: | • Derivation rules  
These are rules that are concerned with preconditions which invoke certain actions;  
• Event-action rules  
These rules are related to the information structure elements, as well as the behaviour of the enterprise activities; |
|                     | • What are the organization’s policies and rules that support or limit the goals?  
• What goals are associated with what rules?  
• How a rule can be decomposed?  
• How does enforcement of a rule is ensured?  
• Which process requires a rule? | • Constraint rules  
These rules are related to the information structure elements, as well as the behaviour of the enterprise activities; |
| **Concepts Model**  | CM is associated with GM and BPM in a way that in the CM the expressions specified in the GM, and the content of the information set from the BPM are stated shortly and clearer. Concepts exist in tangible and intangible state. The model aims at avoiding the misunderstandings among stakeholders by defining precisely concepts that are included in other models. Examples: | • Concepts  
Concepts are in the centre of the interest since they are what “we want to reason about and to characterize and define using relationships to other concepts” (p.43)  
• Attributes  
Attributes are “properties of the concepts” (p.43). |
|                     | • What are the company's concepts related to the goals, processes, and actors?  
• How the concepts are connected with each other?  
• Why is this concept required? | |
| **Business Process Model** | BPM is a model that represents the relations between different processes developed for the achievement of the goals, meaning the way the information and material flow is handled. BPM is highly connected to the specified goals. | • Processes  
A Process is defined as a sequence of activities that has beginning and an end, transforms inputs into outputs; is governed by a set of rules concerning the transformation; and “has a relationship to the Actors and Resources Model” (p.51); |
## Appendices

<table>
<thead>
<tr>
<th>Actors and Resources Model</th>
<th>Technical Components and Requirements Model</th>
</tr>
</thead>
</table>
| • Why a particular process is required? | • External Processes  
• What are inputs and outputs of a process? | These are processes that exist outside of  
the domain of interests and communicate with internal processes; |
• How do the processes facilitate fulfillment of the goals? | • Information and Material sets  
These are the material/information that flow in between the processes or external processes; |
• What are the information requirements? | • Individuals  
These are employees within an organization; |
| ARM describes the link between actors and resources used during the work activities. Further, the relations between the actors and the goals specified within the GM, as well as the processes from the BPM are developed. Base on this model a socio-technical system can be described. | • Organizational units  
These are various organizational structures such as: departments; division; section; project; team, etc.; |
• Which actor performs which task? | • Non-human resources  
Equipment, and various types of machines pertain to these group of components; |
• What is the allocation of responsibilities between the actors? | • Roles  
Depending on the context individuals and organizational units can have different roles; e.g. manager, project leader, controller; |
• What are the relations between the actors? | • Information system goals  
High level goals regarding the information system in the form of aims, directions, vision; |
• Why is an actor required? | • Information system problems  
Undesirable facts that hinder the development of an information system; |
• Which actor is responsible for which resource? | • Information system requirements  
Properties of an information system that need to be developed. Requirements can be either functional (“definite requirements regarding a functional property of the information system” (p.62)) or non-functional requirements (“any kind of requirements, constraints, or restrictions, other than functional” (p.62)). |
Attachment 3 - The EKD models

The Goals Model

- **General Goals Model**

```
  Goal 1
  The Goal is to ensure sustainable growth of the Case Company

  Goal 2
  The Goal is to create a strong brand

  Goal 3
  The Goal is to deliver double digit growth and profitability

  Goal 4
  The Goal is to maintain and ensure a harmonious internal structure of operations

  Goal 5
  The Goal is to ensure high levels of counselling for customer

  Goal 6
  The Goal is to support the decisions made in the PD department concerning development of future products

  Goal 7
  The Goal is to ensure "front" position in development of solutions around new technology

  Goal 8
  The Goal is to leverage the Case Company size and competencies

  Goal 9
  The Goal is to initiate instant information access within the company

  Goal 10
  The Goal is to maximize the internal customer satisfaction
```

GOALS

PROBLEMS

OPPORTUNITIES

CONSTRAINTS
Appendices

Goals for Increased Integration
Appendices

The Business Processes Model
The Actors and Resources Model

Appendices
The Concepts Model
The Business Rules Model

Marketing

Goal 1: The Goal is to ensure high levels of cross-selling for customers
Goal 2: The Goal is to create a winning brand
Goal 3: The Goal is to create high quality training materials to support product sales
Goal 4: The Goal is to measure marketing options to help determine customer efficiency at commitment
Goal 5: The Goal is to measure the level of customer satisfaction
Goal 6: The Goal is to analyze consumer purchase of products
Goal 7: The Goal is to determine the level of product permeation
Goal 8: The Goal is to define market segments
Goal 9: The Goal is to identify competitive threats
Goal 10: The Goal is to analyze market strengths
Goal 11: The Goal is to identify customer requirements
Goal 12: The Goal is to guide a product range

Rules

Rule 1: All suggestions should be shared internally
Rule 2: The obtained data should be stored in a repository
Rule 3: Use only efficient methods and techniques to gather data

Entrepreneur:

Role 23: The business model should be shared internally

Holders:

Goal 13: The Goal is to plan the Sale strategy

Appendices

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Product Development

- **Goal 1:** The Goal is to deliver double digit growth and profitability
- **Goal 2:** The Goal is to ensure that the client is in control of the product development process
- **Goal 3:** The Goal is to ensure world-class innovation processes
- **Goal 4:** The Goal is to identify and act on new technologies
- **Goal 5:** The Goal is to improve the product quality and service delivery
- **Goal 6:** The Goal is to increase turnover by 50% per year
- **Goal 7:** The Goal is to maintain a high share of the market
- **Goal 8:** The Goal is to increase the value of the product portfolio
- **Goal 9:** The Goal is to increase the value of the product portfolio
- **Goal 10:** The Goal is to increase the value of the product portfolio
- **Goal 11:** The Goal is to increase the value of the product portfolio

 Rules:

- **Rule 1:** The information must be acquired employing ethical methods
- **Rule 2:** The information must be acquired employing ethical methods
- **Rule 3:** The information must be acquired employing ethical methods
- **Rule 4:** The information must be acquired employing ethical methods
- **Rule 5:** The information must be acquired employing ethical methods
- **Rule 6:** The information must be acquired employing ethical methods
- **Rule 7:** The information must be acquired employing ethical methods
- **Rule 8:** The information must be acquired employing ethical methods
- **Rule 9:** The information must be acquired employing ethical methods

- **Product Development**

- **Assess the suppliers based on meeting scheduled deliverables**
- **Develop a checklist to help determine which suppliers are the most critical**
- **Develop a reference level for quality to provide a uniform standard for products**

- **Organize frequent training programmes for developing employees' competencies**
- **Leverage the Case Company assets and resources**

- **Maintain high share of customized products**
- **Maintain high share of customized products**
- **Maintain high share of customized products**

- **Supports**

- **Supports**

- **Supports**

- **Supports**

- **Supports**

- **Supports**

- **Supports**

- **Supports**

- **Supports**

- **Supports**

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The Technical Components and Requirements Model
## Attachment 4 - Responsibilities of the Marketing Function  

Table 2.1 - Responsibilities of the Marketing function within PD (Based on: Ulrich & Eppinger, 2008)

<table>
<thead>
<tr>
<th>Phase</th>
<th>Product Planning</th>
<th>Opportunities</th>
<th>Marketing and Sales</th>
<th>Step 1: Identify customer needs</th>
<th>Step 2: Establish target specifications</th>
<th>Step 3: Generate product concepts</th>
<th>Step 4: Select product concept(s)</th>
<th>Step 5: Test product concepts</th>
<th>Step 6: Set final specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output: Product portfolio and time for introduction of the products to the market</td>
<td></td>
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<tr>
<td></td>
<td>Customer complaints, Lead users and Customers suggestions, Trends in technology and market opportunities</td>
<td>Market segments where the product opportunities best address the weaknesses in a company own products and work and product weaknesses offered by the competition Evaluate market size and market growth rate Assess competitive learning</td>
<td>Make decisions concerning the product timing Assess market readiness. Help in defining the sequence of product introductions. Assist in defining the product plan</td>
<td>Assist in development of the product Articulate the reasons for a customer to buy the future product</td>
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</tr>
</tbody>
</table>

### Phase 1: Concept Development  

**Output: Decide on the shape, function and features of a product**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Step 1: Identify customer needs</th>
<th>Step 2: Establish target specifications</th>
<th>Step 3: Generate product concepts</th>
<th>Step 4: Select product concept(s)</th>
<th>Step 5: Test product concepts</th>
<th>Step 6: Set final specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Understand customer needs. What customer wants which involving raw data gathered from the interview by means of survey. Organize needs into hierarchy. Establishing relative importance of the needs. Communicate customer needs to the other functions.</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>Determine the product vision.</td>
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</tr>
<tr>
<td>3</td>
<td>Generate product concepts.</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>Select product concept(s).</td>
<td></td>
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<tr>
<td>5</td>
<td>Test product concepts.</td>
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<tr>
<td>6</td>
<td>Set final specifications.</td>
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</tbody>
</table>

### Phase 2: System-level Design  

**Output: Develop a product architecture, geometric layout of a product and functional specifications of each of the product subsystems**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Output:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Draw a schematic of the product.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Identify the fundamental and incidental interactions.</td>
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</tr>
<tr>
<td>3</td>
<td>Assist in the choice of functional elements and their arrangement.</td>
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<tr>
<td>4</td>
<td>Assist in developing alternatives for grouping elements in sub-assemblies.</td>
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<tr>
<td>5</td>
<td>Check the feasibility of the sub-assemblies.</td>
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<tr>
<td>6</td>
<td>Assist in tradeoff between the design constraints and community</td>
<td></td>
</tr>
</tbody>
</table>

### Phase 3: Detail Design  

**Output: Control documentation of the product—geometry of each part, production tooling, specification of the purchased parts**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Step 1: Estimate the manufacturing cost</th>
<th>Step 2: Reduce the cost of components</th>
<th>Step 3: Reduce the cost of assembly</th>
<th>Step 4: Reduce the cost of supporting production</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

### Phase 4: Testing and refinement  

**Evaluation of preproduction product version and whether a product is as designed and whether the product satisfies the key customer’s wants about performance and reliability**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Step 1: Define the purpose of the prototype</th>
<th>Step 2: Establish the level of approximation of the prototype</th>
<th>Step 3: Outline experimental plan</th>
<th>Step 4: Create a schedule for preproduction, construction, and testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</tbody>
</table>

### Phase 5: Production Rampup  

**Plan early production with key customers**

| Step | Description | Step 1: Place early production with key customers | |
|------|-------------|-----------------------------------------------| |
| 1    | | |

### Phase 6: Evaluation  

**Evaluate the early production output**

| Step | Description | Step 1: Place early production with key customers | |
|------|-------------|-----------------------------------------------| |
| 1    | | |

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