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Master's Thesis

Identification of Success Factors and Optimisation Potentials in the Customer Process

Using a Stakeholder Analysis in the Examples Audi A8-, A6-, and A3-Successor

Florian Bertuch

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Adviser: Univ.-Ass. Dipl.-Ing. Harald Wipfler
Auditor: Univ.-Prof. Dipl.-Ing. Dr. techn. Stefan Vorbach

Graz University of Technology
Institute of General Management and Organization

UFG

Adviser: Marius Kohlhepp
Auditor: Klaus Verweyen

AUDI AG
Product Strategy: Innovation and Attribute Planning (I/VS-12)

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Abstract

In times of rapid change, increasing complexity and intense competition, companies are forced to satisfy customer needs and requirements. Therefore, the alignment of development activities with the needs and requirements of customers in the early phase of product development is one key factor for the success of a company. The identification of customer requirements only demonstrates the first step in a wide-area process. Without a well-directed forwarding and a user-oriented format, the customer information is useless for the company. Only through a systematic integration into the company and its processes will an effective use of this information be possible.

AUDI AG has recognised the importance of customer orientation and has just created the *"Customer Process"*, in order to successfully integrate identified customer requirements into the Product Development Process. Since the Customer Process is situated in the initial stage, the level of awareness within the company is relatively low. Thus, the Customer Process is not practised as defined. This can be attributed only to a partial definition of separate responsibilities and tasks between the individual *"Customer Days"* (internal meetings to discuss customer requirements) and to a partially low interest of some involved departments in the Customer Process. Therefore, this thesis aims to identify necessary success factors and optimisation potentials in order to establish the Customer Process within AUDI AG and to convince all involved departments of its benefits. For this, concrete recommendations for improving this process should be prepared.

At the beginning of this thesis a detailed literature review provides the necessary knowledge of the subject matter, relating to customer orientation as well as customer-oriented product development. This research also includes an overview of customer-oriented product development at AUDI AG. In the course of the empirical study all departments involved in the early phase are analysed, by means of a stakeholder analysis, in order to identify their demands, motivations and interests. Based on expert interviews with the identified stakeholders, the deficits of the Customer Process are worked out and fields of action are derived from those. Afterwards, success factors and optimisation potentials are highlighted. Finally, potential proposals for solutions related to the identified fields of action are described and concrete suggestions for improvements for optimising the Customer Process are developed.

Keywords: customer orientation; customer-oriented product development; stakeholder analysis; advance development process; cooperation management

Contents

Abbreviations

ABS	Anti-lock Braking System
CAP	Customer Active Paradigm
DF	Design Freeze
EOP	End of Production
ESC	Electronic Stability Control
HoQ	House of Quality
KE	Decision of the Concept
MAP	Manufacturer Active Paradigm
MasterPP	Master Product Process
MLB	Modular Longitudinal Tool-Kit
MQB	Modular Transverse Tool-Kit
NCBS	New Car Buyer Survey
NIH	Not-Invented-Here-Syndrome
NPD	New Product Development
OEM	Original Equipment Manufacturer
PEP	Product Development Process
PF	Product Feasibility
PPT	Product Planning Team
PS	Start of the Project

QFD	Quality Function Deployment
R&D	Research and Development
SOP	Start of Production
TKB	Technical Concept Description
TPB	Technical Product Description
USP	Unique Selling Proposition
VDI	Association of German Engineers
VKF	Virtual Concept Vehicle

Abbreviations of Departments at AUDI AG

AEV	Audi Electronics Venture
I/EB-1V	Advance Development and Innovation Management
I/EB-23	Attributes of the Total Vehicle
I/EB-P	Concept Management Vehicle Projects
I/EG-G	Project and Requirement Management Total Vehicle
I/ET-.	Technical Project Management
I/ET-8	Process and Method Development
I/FE-.	Controlling Total Vehicle / Modules
I/GM	*"Modellreihe"*
I/GM-5	Product Planning
I/GM-.	Project Management
I/VS	Brand and Sales Development
I/VS-1	Product Strategy
I/VS-12	Innovation and Attribute Planning
I/VT	Product Marketing
I/VT-.	Product Marketing
I/VT-62	Product Marketing Markets and Requirement Management
VE-SL	Advance Development - Strategy Manager

1 Introduction

In times of rapid change, increasing complexity and intense competition, companies are forced to satisfy customer needs and requirements (Heiss, 2009, p.1). Due to technological progress, social changes and legal framework conditions, customer orientation becomes a decisive competitive factor for companies (H. Holland, 2009), (Gochermann, 2004). Therefore, it is important to align development activities with the needs and requirements of the customers, because customers are the foundation of any successful business (Hinterhuber and Matzler, 2009). Thus, customer orientation is considered in the literature beyond controversy as the crucial success factor for product development (Yli-Renko and Janakiraman, 2008).

This makes it clear that determining and understanding the needs and requirements of customers, as well as the appreciation of product attributes which are relevant for purchase behaviour, represent difficult tasks in the context of automotive product development (Brockhoff, 1999, p.10-22), (Fang, 2008).

Customer orientation in product development can only be implemented if an extensive knowledge about the customer is available in the company. It is important that all decision-makers can be provided with actual, accurate and extensive information. (Nieschlag et al., 1997, p.670-671) Furthermore, it is necessary to transfer this knowledge to the business divisions which are not in contact with customers, as in Research and Development (R&D), because they are responsible for the development of new products. In consistency with this, numerous studies show that actual, considerable and credible knowledge about customers' needs and requirements is of outstanding importance for successful product development (Yli-Renko and Janakiraman, 2008), (Henkel and Hippel, 2004), (Zernott, 2004).

Deficient knowledge about customer's needs and requirements often leads to a frequent discrepancy between products developed by Original Equipment Manufacturer (OEM)s and claimed by customers. Therefore, over-engineering and over-promising occurs. (Plinke, 1990), quoted by (Wildemann, 2004, p.3)

> *"All too often innovations fail to address customer needs."* (Wyman, 2007, p.14)

Especially in the early phase of the product development in the so-called *"fuzzy-front end"*, customer orientation plays a decisive role (Lüthje, 2007, p.40). On the one hand, because the creation of

innovations is counted as one of the most important success factors in the automotive industry. Innovations are necessary for maintaining a strong competitive position in the market. They are the only way of facing the global challenges of this industry (Wyman, 2007, p.4) On the other hand, innovative projects are often characterised by huge uncertainties. However, significant potentials exist to reduce these uncertainties and be cost-effective, especially in the early phase. As can be seen in figure 1.1, the freedom of scope is high but the level of information is relatively low. (Verworn, 2005, p.66)

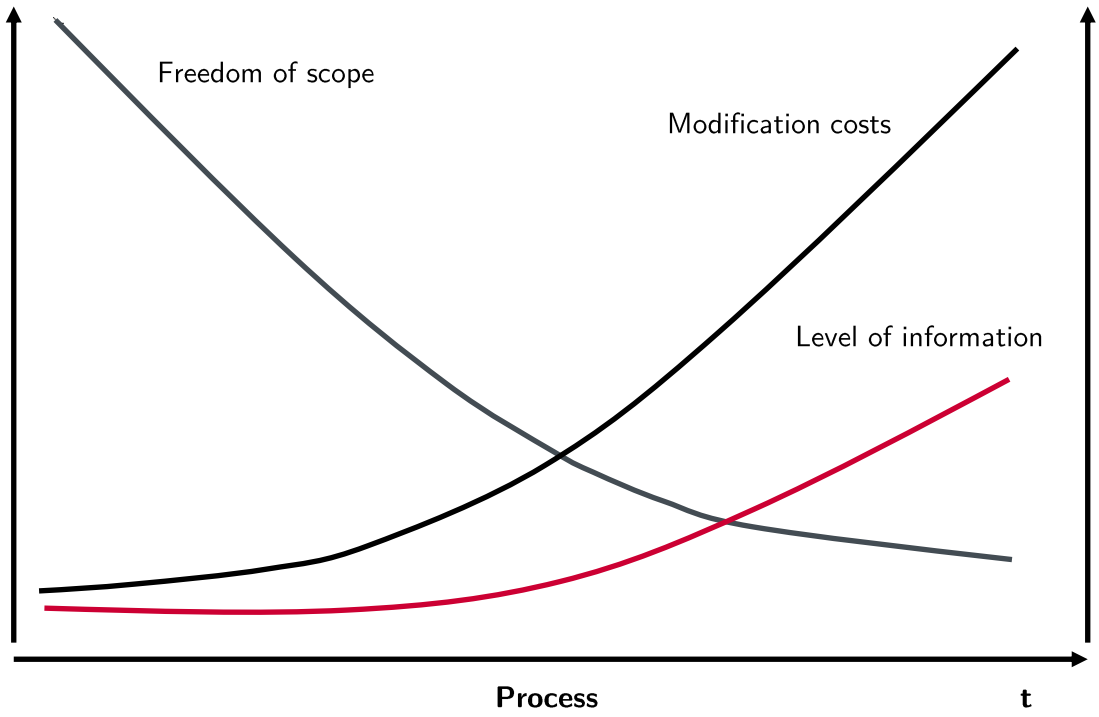

Figure 1.1: Potentials and Constraints of the Early Phase, cf. (Verworn, 2005, p.173)

Therefore, it is important to increase the level of information in the early phase in order to use its potential to its best. In the case of customer orientation, the identification of future customer demands demonstrates here only the first step in a wide-area process. Without a well-directed forwarding and a user-oriented format, customer information is useless to the company. In order to increase the level of information effectively, a systematic integration of information into the company and its processes is needed.

1.1 Task and Problem Specification

According to the strategy 2020 of AUDI AG, Audi's vision is to be the premium brand number one in the year 2020 (see figure 1.2). In order to achieve this vision the aim is to equip Audi for

the challenges for the future and to delight customers worldwide. Therefore, AUDI AG has placed evoking customer delight at the very heart of its strategy. (AUDI AG, 2012a, p.142-143)

Figure 1.2: The Audi Brand's Strategy 2020, (AUDI AG, 2012a, p.142)

Derived from the strategy 2020, Audi aims for a stronger alignment of business processes, especially the Product Development Process (PEP), to customer needs and requirements (AUDI AG, 2012c, p.3). Up to now AUDI AG was very successful with their technology-push strategy, because Audi is highly technology-driven. In order to delight customers and because technology-push projects offer a higher market uncertainty, there is a change in the direction of market pull within the company. Consequently, Audi enforces to introduce the requirements of customers into the processes of the company to develop products more target-oriented referring to customer needs.

In particular, AUDI AG also turns its attention to defining innovations. In order to be successful, the latent needs of future customers must be considered, not just the demands of the current ones (K. B. Clark and Fujimoto, 1992, p.23). Therefore, there is a need to create innovations target-oriented from a customer's point of view in order to have the right innovations, in the proper time and in the correct vehicle. Here, Audi is anxious to integrate information about potential demands on future vehicles into the Advance Development Process at an early stage, in order to increase the level of information as well as to use the potentials of the early phase at its best.

Furthermore, the experience at AUDI AG has shown that there is a necessity for a greater signifi-

cance of customer needs during product development because the requirements of the customers or markets have not always been taken into consideration in the development during previous years. In order to respect customer requirements in the development process, they must be translated into technical targets, as development engineers are oriented to measurable product attributes (K. B. Clark and Fujimoto, 1992, p.23-24). Therefore, a process is needed with an objective to provide a platform between the business division Technical Development and Marketing & Sales to translate the identified customer requirements into technical target values. In further progress, it is decisive to monitor the implementation of these requirements in the course of product development and to determine their degree of fulfilment. Based on this, consequences relating to volumes and prices can be derived, which have an impact on company success.

To make these grades, the business division Marketing & Sales has just newly created the *"Customer Process"* in order to fix the customer needs in the PEP of AUDI AG and in the associated committees. With this process they would lie to provide a platform for a constant dialogue between the involved departments and to monitor the implementation of customer requirements into product development. Moreover, they would like to increase the level of information in the early phase, by providing knowledge about customers and their future demands. A further objective of the Customer Process is to structure advance development in order to have an answer to the customer needs in due time and to trigger the innovations target-oriented into the PEP.

With the aid of the Customer Process, the customer requirements are contributed to the PEP and that degree of fulfilment is monitored in sequel. For this purpose, 5 different so-called *"Customer Days"* with diverse tasks and goals take place during the project, in the form of milestones, where the future requirements are communicated to the company and are compared with the actual existing technical solutions. In addition, measures are defined in order to achieve these needs and consequences are derived in the case of non-fulfilment.

Since the Customer Process is situated in the initial phase and the implementation is still in progress, the level of awareness of this process within the company is relatively low. Thus, the Customer Process is not practised as defined yet. On the one hand, this is due to the reason that the separate responsibilities and tasks between the individual Customer Days are only partially defined. At the moment, only the Customer Day "1" has taken place in practice. Therefore, AUDI AG is just "learning" to do the corresponding steps. On the other hand, it is not totally clear yet who are the involved departments and which needs are to be considered in the further progress of the Customer Process. Furthermore, it can be seen that the interest of some departments in the Customer Process is relatively low and that they do not stick to it, which cause conflicts between departments and resistances against the Customer Process. This arises from the reason, that these diverse involved departments have different demands, motivations, functions and problems to solve. But, if not all involved departments pull together, the identified customer requirements cannot be integrated into the product development and implemented in the further progress successfully.

This leads to the demand for an analysis of the Customer Process and the involved departments, in

order to establish the process within AUDI AG and to convince all stakeholders of the benefits of the Customer Process.

1.2 Aim and Scope of the Master's Thesis

The aim of this master's thesis is to optimise the Customer Process at AUDI AG, so that this process is practised as defined. Therefore, success factors and optimisation potentials in the Customer Process should be identified in order to establish the process within the company.

Especially the necessary tasks, responsibilities, process steps and success factors which are needed to firmly anchor the customer requirements in the PEP and to make them effective, should be identified in the context of this master's thesis. Furthermore, which departments are involved in the Customer Process should be analysed and which demands, motivations, interests and problems they have should be surveyed in order to integrate them effectively. Therefore, a stakeholder analysis, using expert interviews, should be carried out in order to discover the opinions, processes, roles and motivations of each stakeholder. The aim here is to find out how various departments are seen alongside the Customer Process and its implementation, how they can get motivated for the Customer Process and how possible existing conflicts and resistances can be resolved. In particular, the relationships between the individual stakeholders in this connection play an important role, which should also be considered in detail. Based on the findings of the stakeholder analysis, potential fields of action should be derived and success factors and optimisation potentials should be highlighted. Finally, concrete recommendations for improving the Customer Process should be described.

This thesis focuses on the early phase of product development at AUDI AG, especially on the first three Customer Days and on the intermediate processes, because these are the most relevant ones in the Customer Process. Therefore, the vehicle projects of the Audi A8-, A6-, and A3- successor are used, because each project is situated at one of the first three Customer Days. Thereby important findings for optimising the Customer Process can be identified and already acquired experiences can be analysed.

At the time of submitting of this thesis, an extensive re-organisation of most of the business divisions of AUDI AG takes place, which is not discussed here. Consequently, the names of departments refer to the status before the re-organisation and future changes in the corporate structure are not considered.

1.3 Approach of the Master's Thesis

To achieve the verbalised aims, this master's thesis contains in the first instance theoretical parts of customer orientation and automotive product development as well as an overview of the product development at AUDI AG. Furthermore, this thesis contains a stakeholder analysis with its findings and identified fields of action as well as proposed solutions. The structure of the master's thesis is discussed in the following.

The present master's thesis is divided into six chapters.

In connection with this **introduction**, theoretical basics of customer orientation and customer-oriented product development in the automotive industry are gathered in the **second chapter**. The sub-chapters refer to customer orientation, to the implementation of customer orientation within the company, to product development in the automotive industry generally, (especially in the early phase) and finally to customer-oriented product development.

In the **third chapter**, this leads to the consideration of customer-oriented product development at AUDI AG. Specifically, the product development and the customer orientation at AUDI AG are considered. In this connection the Customer Process with its particular Customer Days is described. Therefore, chapters 2 and 3 provide the theoretical basis of this thesis.

The stakeholder analysis of the Customer Process at AUDI AG is the subject of the **fourth chapter**. In this chapter, the approach of the stakeholder analysis, the procedure of gathering relevant information and the realisation and evaluation of the stakeholder analysis are discussed. In addition, success-critical fields of action for the optimisation of the customer process are derived from the findings of the stakeholder analysis.

The **fifth chapter** is about the formulation of proposals for solution according to the four major, identified fields of action. These are the Customer Process, respectively Customer Days, Process-Standards, Cooperation Management and finally the Advance Development Process. All these four fields of action are divided into sub-fields of action for whom proposals of solution are prepared. These suggestions of improvement conduce to optimise the customer orientation and the Customer Process at AUDI AG.

To conclude, the **sixth chapter** contains a final discussion of the results of the present thesis. Based on theoretical insights and empirical findings, the central results are summarised and the success factors are highlighted. Finally, a future prospect for further optimisation potentials is given. Figure 1.3 overviews the presented approach of this thesis.

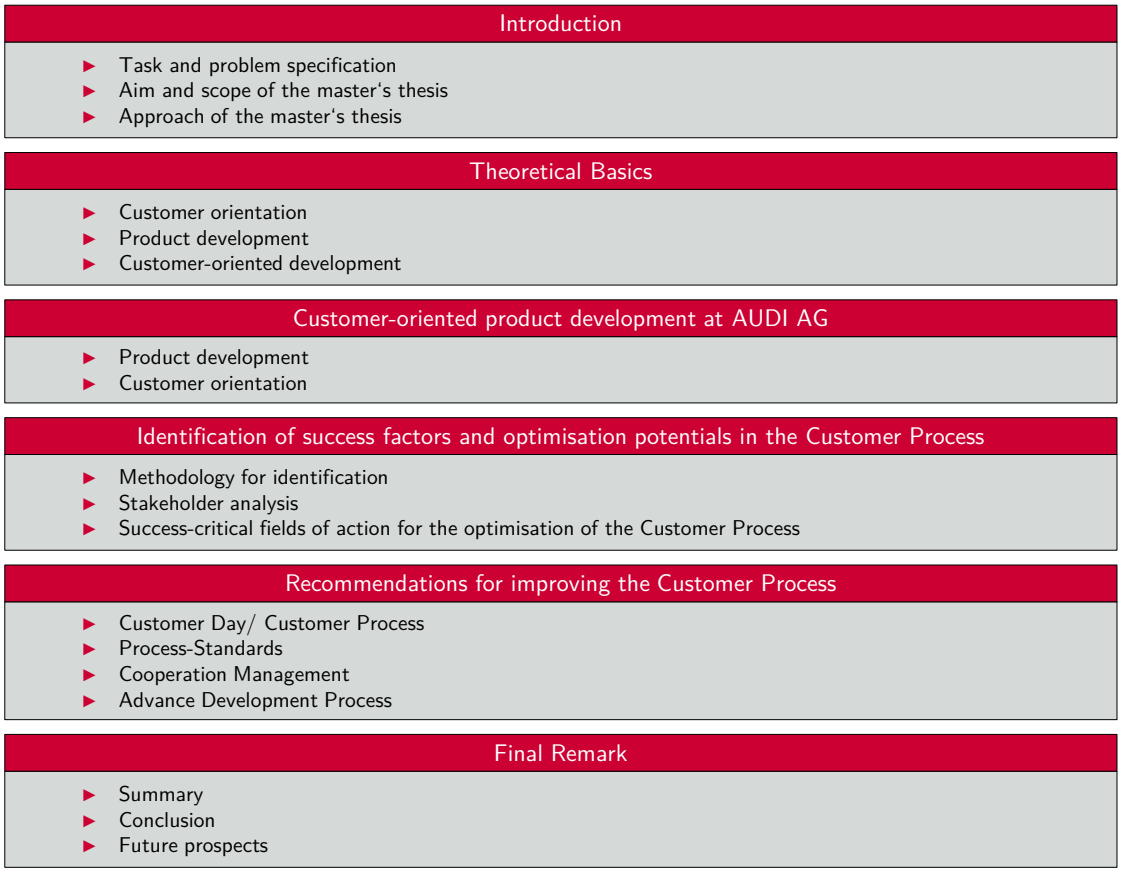

Figure 1.3: Approach of the Master' Thesis

2 Theoretical Basics

This chapter provides an overview of the theory of customer orientation, product development in the automotive industry and customer-oriented product development in general. It starts with the subject customer orientation in order to understand the meaning and the importance for organisational success. The next part deals with the implementation of customer orientation within the company. Here, it is described which aspects need to be considered by implementing customer orientation within the organisation. In the next step, product development in the automotive industry is considered briefly. The focus lies especially on the PEP. Particularly important for the generation of innovations is the early phase of product development, which is discussed in the next section. Finally, as this master's thesis focuses on customer-oriented product development, it is necessary to take a closer look at this subject. Here, the role of the customer in the development of new products is described, and useful techniques and methods for the implementation of customer orientation in product development are provided.

2.1 Customer Orientation

The demand of customer orientation is not new. Previously, in the early fifties, customer orientation found its way into marketing (Diller, 2001, p.870). More than 50 years ago, Peter Drucker described the marketing concept as follows:

> *"There is only one valid definition of business purpose: to create a satisfied customer. It is the customer who determines what the business is. Because it is its purpose to create a customer, any business enterprise has two - and only these two - basic functions: marketing and innovation. [...] Actually marketing is so basic that it is not just enough to have a strong sales force and to entrust marketing into it. Marketing is not only much broader than selling, it is not a specialized activity at all. It is the whole business seen from the point of view of its final result, that is from the customer's point of view."* (Drucker, 1954, p.37)

In the early eighties, Peters and Waterman (1983), with their book about lessons from America's best-run companies, intensified the discussion about the topic customer orientation. Peters and

Waterman (1983, p.36) identify that being *"close to the customer"* is one of the eight key factors for company's success.

According to Handlbauer and Renzl (2009, p.149) the primary objective of customer orientation is the satisfaction of customer needs. Moreover, Atuahene-Gima (1995, p.285-286) shows empirically that market orientation has a great impact on new product success. Consequently, a positive relationship between market orientation and business profitability can be determined (Slater and Narver, 1990). Therefore, it is important to collect and disseminate information about competitors, customers and technologies at the early stage of product development.

Despite its long history and its advantages, customer orientation has not found its way into many companies. The reason for this may be the lack of a comprehensive and integrative concept of enforcing customer orientation. Therefore, it is essential to contemplate customer orientation in an overall context and to include it into processes. (Bruhn, 2007, p.1) One reason for the existing implementation deficit of customer orientation is that so far, no uniform understanding and therefore no homogeneous use of this term is detected. For this reason subsequent disambiguation is vitally important.

2.1.1 Customer Orientation versus Market Orientation

Slater and Narver (1998, p.1001-1002) mention that today two basic concepts influence the product development of producing companies: **customer orientation** and **market orientation**. Commonly these terms are mixed in the literature, but according to Slater and Narver (1998) these two concepts should not be confused. With customer orientation, the expressed desires of the customers and their satisfaction are meant. This philosophy is reactive and short term focused. On the other hand, market orientation has a long-term focus and tries to understand the expressed and latent needs of customers. Thus, market orientation is rather proactive and it, unlike customer orientation, is concerned with the explicit consideration of the competition.

Typically, a customer-oriented company uses focus groups and customer surveys, concept tests as well as conjoint analyses to enhance a better understanding of expressed customer requirements and to guide the development of new products. One disadvantage of this approach is that past or topically oriented methods are usually more an adaptation to existing conditions and client groups, instead of a proactive knowledge and market development.

The proactive market orientation implicates the latent requirements of the customer. This concept combines traditional market research techniques with other methods to discover the future demands of customers. For example, the Lead User approach should be mentioned.

Lead Users are customers who

> *"... are ahead of the majority of users in their populations with respect to an important market trend, and they expect to gain relatively high benefits from a solution to the needs they have encountered there"* (Hippel, 2005, p.4)

Market-oriented companies are looking specifically for new markets rather than only supporting existing customer groups. Their innovativeness is positively influenced by market orientation.

In table 2.1, a comparison of customer orientation and market orientation is shown.

	Customer orientation	**Market orientation**
Strategic orientation	Expressed needs	Latent needs
Adjustment style	Responsive	Proactive
Temporal focus	Short-term	Long-term
Objective	Customer Satisfaction	Customer Value
Learning type	Adaptive	Generative
Learning process	Customer surveys	Customer observation
	Key account relationship	Lead-user relationship
	Focus groups	Continuous experimentation
	Concept testing	Selective partnering

Table 2.1: Comparison of Customer Orientation and Market Orientation, cf. (Slater and Narver, 1998)

In contrast, Bruhn (2007, p.15-19) distinguishes between the following forms of interpretation of customer orientation: information, culture, and philosophy oriented as well as performance and interactions-oriented perception. Corresponding to information-oriented perception, an organisation is customer-oriented, if it understands and analyses the needs and requirements of actual and potential customers and if it propagates these within the company. In the context of the culture and philosophy-oriented perception, the customer orientation is interpreted as part of the corporate culture, which, for example, influences the contact with customers. At the third perception, the performance and interactions-oriented one, it is assumed that customer orientation is revealed on the one hand as a service offer and on the other hand as flexible contact with customers.

In connection to this, customer orientation at Audi is defined as a mix of market orientation and customer orientation. Short-term needs expressed by customers as well as identified latent needs are considered in product planning. According to Bruhn (2007), in particular the information-oriented perception matters in the context of the present thesis.

2.1.2 Challenges for Customer Orientation in Product Development

Changes in the economic environment force companies to a continuous preoccupation with the surrounding environment, in order to be successful in the long term compared with the competition

(J. Becker and Kahn, 2012, p.3). Therefore, a strong focus on customer needs is necessary to counteract factors like rapid technology change, the internationalisation and globalisation of markets as well as the increasing transparency of information because of the internet, in order to generate a competitive advantage and to achieve a high satisfaction of customers (Bruhn, 2007, p.2). That is why companies have to exert market and customer orientation, compile innovations in a specific way and develop products based on this (Renner, 2006, p.9). Ultimately, customers decide on the success or failure of a company on the market through their purchase decision (Wildemann, 2004, p.2).

However, the degree of customer orientation shows deficits in automotive product development (Wildemann, 2004, p.3). This could be traced back to the increasing development effort and complexity in the automotive industry, whereby an extension of the PEP is required. Thus, engineers are under high cost and time pressure, which often results in a disregard for customer orientation (Ozer, 1999, p.78).

A further reason for deficient customer orientation in product development is, that most of the engineers are of the mind that customers do not know what they want (Workman, 1995, p.132).

> *"If I had asked people what they wanted, they would have said faster horses."* (Henry Ford)

Engineers believe that customers are only able to articulate current demands and problems they are familiar with. Therefore, engineers do not often consider information about customer requirements from marketeers, which inevitably results in a lack of customer orientation. (Workman, 1995, p.132) In addition, this also handicaps the relationship between marketing and R&D.

2.1.3 Challenges and Considerations in the Implementation of Customer Orientation within the Company

The objective of implementing customer orientation within the company is to align corporate strategy, processes and products with customer needs, thus contributing to increasing company success (Greve, 2009, p.11).

According to Kolks (1990, p.78-79), quoted by (Meffert et al., 2012, p.775) the implementation of customer orientation should be perceived as a process consisting of two subtasks. On the one hand, the **assertion of customer orientation**, which requires in particular, the creation of acceptance of customer orientation for affected company members and the elimination of any implementation barriers. On the other hand, the **implementation of customer orientation**, which is about a specification of the new strategy and about cross-functional coordination of measures as well as an adaptation of corporate culture, structure and systems.

These two subtasks are essential because on the one hand, an implementation is not possible without an adaptation of corporate culture and structure. On the other hand, the implementation is at risk, if employees do not support it. Therefore, it is important to gain acceptance so that all employees pull together.

However, the implementation of customer orientation signifies change, which implicates a loss of stability and security. Traditional practices are replaced by new and unknown ones, which cause insecurity and uncertainty. These can lead to resistances, which can prevent the implementation.

Thus, the first step of implementing customer orientation is about gaining acceptance, by conveying the content of the new concept or strategy. Here, there is a need to distinguish between two addressees: The first group is the upper and middle management, who must be informed about the reasons for the strategic change and about its consequences in order to increase understanding. The second group are all other employees who must be informed about the contents of the new concept. The implications for their areas have to be discussed in order to eliminate barriers of understanding. Ideally, all affected people and departments should be involved in the implementation process as early as possible, in order to avoid conflicts.

Processes of change in companies often preclude deadlocked behaviour, power structures, specific area-related values and thought patterns, which can cause resistances and conflicts (implementation barriers). These can hinder the progress of implementation. Here, communication has proven to be a good opportunity to identify such barriers. (Meffert et al., 2012, p.778-779)

Hence, Vahs (2007, p.336) mentions the following implementation resistances, which can occur:

- Rational resistances,
- Political resistances and
- Emotional resistances

Rational resistances are mostly about the logical, traceable argumentations of different departments or employees. Political resistances occur mainly from the fear of losing position or acceptance in the company. Emotional resistances also appear from fear of changes inside the company. Here it is mostly about the subjective emotions of individual employees and not about factual considerations. (Vahs, 2007, p.336)

In addition to these behavioural resistances, conflicts may also arise in the course of implementing customer orientation as a new strategy. Therefore, it can be distinguished between conflicts within one division or department and conflicts between divisions or departments.

Conflicts inside a division or department may arise out of the following reasons (Tarlatt, 2001), quoted by (Meffert et al., 2012, p.780):

- **Heterogeneous group composition:** If a department consists of many different employees respective age, background, moral concept, hierarchical position in the company etc. a higher potential of conflicts can occur. Therefore, it is important to have a common ground and a positive cooperation, because a lack of these two things is often a catalyst for conflicts.

- **Role conflicts:** Conflicts can also often occur due to roles that are taken from particular persons. Here, several types of conflict can arise. This happens, if an employee has to comply with different roles or if the value or the attitude of the person does not fit his/her respective role in the company process. Furthermore, it is possible that instructions or expectations which are given by several people in their roles, are in contradiction to each other.

Implementation conflicts between divisions or departments may occur as a consequence of the following reasons (Tarlatt, 2001), quoted by (Meffert et al., 2012, p.780-781)

- **Task-oriented:** This type of conflict can occur, if a department is dependent on another one in the performance of its tasks.

- **Horizontal differentiation:** If two departments work together to fulfil one task, conflicts can arise if there is a high degree of horizontal differentiation. This may be due to different goals, attitudes, values, etc. This can be traced back to a lack of common ground and a lack of cooperation. In this context, cultural conflicts may occur between two business areas, for example between Marketing & Sales and R&D.

- **Conflicts of distribution:** This means, that conflicts between departments could occur regarding the distribution of financial and human resources.

Further conflicts of implementation, which concern both within as well as between divisions and departments are listed as follows (Tarlatt, 2001), quoted by (Meffert et al., 2012, p.781-782):

- **Divergences of expectations:** Divergences of expectations describe the fact that management among themselves and in comparison to their employees hold different views about the new concept, process or strategy. It is thought that the lower the perceived chance of success, the lower the commitment of the person, which may in turn lead to conflicts.

- **Degree of formalisation:** This is about the degree to which rules and regulations are complied with within the company. Conflicts can appear from non-compliance of rules, but it does not mean that conflicts can be avoided at a high degree of formalisation.

- **Degree of participation:** The higher the degree of participation of managers and employees in the implementation of policies, strategies or processes, the greater the potential for conflicts due to different viewpoints and values.

The basis for a successful implementation of customer orientation is only given, if existing conflicts can be resolved. In advance, it is important to communicate strongly, otherwise further opportunities for conflict resolution can be presented (Meffert et al., 2012, p.783):

- **Convictions:** The easiest way to solve a conflict is through conviction of the involved areas. For this purpose, an already existing balance of interests is required.
- **Compromise:** A compromise can be achieved if all parties make concessions in terms of their ideals. For this form of conflict solving and for the persuasion of others parties, high communication skills are necessary.
- **Overarching objectives:** With the help of overall objectives, conflicts between departments or business divisions are to be solved by both parties reflecting the common objectives, which are anchored in the corporate strategy, for example.
- **Mediation:** If no common solution can be found between two parties, a mediator shall be used in the form of a hierarchical supervisor or an external consultant.
- **Fight or retreat:** In hopeless conflicts of interest, often the fight or the retreat of a party decides which concept, strategy, etc. will be implemented.
- **Force:** In this context, the term force is understood, for example, as a direct instruction from a supervisor. In the course of this method however, resistances can often occur.

According to Krüger (2009, p.172-177), new processes, strategies or concepts can be implemented in a company by using two approaches. Here, a distinction is made between top-down and bottom-up implementation. At the bottom-up implementation, the development of the new process, concept or strategy is performed close to the users/employees and is then reported to each of the higher hierarchical levels, where it is approved or modified. In contrast, at the top-down implementation, a new process, strategy or concept is formulated from the highest management level and passed on to the lower levels as a default or instruction.

Both approaches have their advantages and disadvantages. The bottom-up implementation requires a high degree of personal initiative and participation of the employees. This must be possible through appropriate structures within the company. At the top-down implementation, the strategy will be set only by a few high executives, hence the degree of participation is relatively small. The prerequisite for a top-down implementation is an authoritarian corporate structure to enforce the new concept down to the lowest corporate level. The authoritarian approach may be useful in conflict situations, but can also lead to resistances.

As mentioned before, the implementation of customer orientation as a new strategy can be roughly divided into two areas of responsibility. Firstly, the content needs to be worked out in detail to be

able to take concrete action and on the other side an adaptation of the corporate potentials such as corporate culture, organisational structure, and corporate systems is necessary.

When specifying the content, it involves on the one hand the definition of the organisational scope of application and on the other hand the new concept has to be detailed to the various functions within the company. For this purpose, it must be investigated which divisions have to participate in the creation of a new process, concept or strategy. Furthermore, considerations should be given as to whether the new concept should be introduced gradually or all at once. Then the tasks and functions have to be worked out in detail at each department and responsibilities for each step have to be determined. (Meffert et al., 2012, p.785-786)

Furthermore, in order to successfully implement customer orientation in the company, certain conditions must be created. Therefore corporate culture, organisational structure as well as communication and information systems must be matched. (Meffert et al., 2012, p.813-814)

The **corporate culture** is a crucial success factor for the successful implementation of customer orientation. According to Franken (2010), corporate culture is defined as follows:

> *"Corporate culture is the collectivity of behaviour-influencing values, norms and symbols in a company that are created, shared and further developed together interactively, and which provides a basis for company's identity."* (author's own translation, Franken, 2010, p.209)

The corporate culture influences the behaviour of employees and thus the course of internal processes as well as the image of the company (Meffert, 2000, p.1110). According to Oelsnitz (1999, p.284-285), a customer-oriented corporate culture is characterised by the following features:

- The mental flexibility of managers as well as of operational staff
- An environment, that supports the creativity and independence of each employee
- A high significance of internal communication
- The widest allocation of competences and empowerment
- A dedicated prioritising of the customer's requests
- The promotion of a sense of personal responsibility
- A distrustful attitude to traditional ways of thinking
- A fundamental openness and open mindedness to new ideas
- A tolerant attitude towards mistakes and costs which are primarily caused by an (over)-emphasised customer orientation

In order to achieve a customer-oriented and open corporate culture, the example of management is necessary. That means, that the top management have to participate in the creation of the corporate culture and have to set a good example. (Wecht, 2006, p.175)

Another important issue for the implementation of a customer-oriented corporate culture, especially in the R&D departments, is the abatement of the so-called *"Not-Invented-Here-Syndrome (NIH)"* (Katz and Allen, 1982), quoted by (Wecht, 2006, p.175).

In this connection, it is about the categorical exclusion from new ideas coming from the external environment of a company. In this case, it is decisive to establish an open corporate culture. For achieving this, training programs or job rotations are helpful, in order to break down prejudices and to realise a more open mentality. (Wecht, 2006, p.175-176)

In contrast to the adaptation of organisational structures and systems, the change in corporate culture is designed to be a very long-term and difficult process. Employees in particular, are often opposed to such changes because they want to hold on to existing and familiar systems. For employees, alterations are contradictory to entrenched values and norms. Furthermore, it is only partly feasible to enforce cultural change by command (Meffert, 2000, p.1110)

Plinke (1996, p.50), in his contribution about customer orientation as precondition to customer integration, investigated that the biggest barrier to the realisation of customer orientation lies beside collaboration and corporate culture in the **company internal structures** and systems. Therefore, the following shortcomings are mentioned:

- A non customer-focused organisational structure
- Product-oriented structures instead of a market-oriented ones
- A lack of process-oriented structures
- Systems of employee's payment
- A lack of incentive systems for customer orientation
- Missing standards for customer orientation

Wecht (2006, p.176-177) also mentions that the corporate structure has a high importance for the customer orientation of a company. It serves for an establishment of a structural customer integration into the PEP. For this purpose, the arrangement of tasks, responsibilities and allocation of resources is crucial for successful customer integration.

Especially, one of the crucial deficits in the implementation of a customer-oriented corporate management practice lies in the lack of organisational anchoring and in allocation of responsibility. Often a central department is lacking, which is responsible for the coordination of customer-oriented operations. Moreover, many companies implement customer-oriented activities in different departments. The result is an organisational separation of departments responsible for customer orientation, often tightened by a different hierarchical arrangement of these departments. This organisational separation and the lack of a decision process can lead to the risk of *"work at cross-purposes"*. (Fuchs and Unger, 2007, p.26-27)

Often traditional organisational structures such as the product, or matrix organisation, are inhibiting

due to the lower flexibility to the implementation of a customer-oriented corporate management. A formation of decentralised units, an increased process orientation, an upgrading of cross-functional cooperation in the form of a team organisation and an expansion of the decision-making authority of the employee serve mainly to eliminate this deficit. (Greve, 2009, p.21) The dissemination of and the response to customer information is supported, if there is a high affinity and a low potential of conflicts between the departments within the company (Gleitsmann, 2007, p.27).

In the area of **corporate systems**, information systems play a particularly important role, because they protect the collection and dissemination of customer information. Therefore, it is important to trigger the customer needs into the company and into relevant processes. Here it must be ensured that this information is quickly and easily available for all relevant corporate members and that customer needs are anchored in the minds of employees. Furthermore, analysing, planning and controlling systems are also very important for customer orientation. (Gleitsmann, 2007, p.27)

In addition to the implementation of customer orientation within the company, a systematic **control of all customer-oriented activities** is essential, as the company's success depends on it to a decisive extent (Bruhn, 2009, p.57). From the beginning of product definition through to final implementation and introduction on the market there is a long period of time in which many things can change. To answer these changes, it is necessary to constantly compare planned with realised values. In terms of customer orientation in product development, a constant balance between customer requirements and technical solution needs to be achieved in order to identify to which extent the customer requirements are complied. As regards the understanding of control, it can be distinguished between operational and strategic control. Thus, it is verified in the operational control if customer requirement is fulfilled with the help of a proper technical solution. By the strategic control, it is checked if the customer need is still up to date, due to the long period of time. (Raps, 2008, p.95)

2.2 Product Development

This section is aimed at creating an elementary understanding of product development, which is necessary for this thesis. Especially, the importance of a clearly defined PEP is highlighted. In order to establish an understanding for the PEP, diverse models are considered. Afterwards a general PEP in the automotive industry is described briefly. As mentioned in chapter 1, the early phase of product development is decisive for customer orientation. Therefore, the characteristics of this phase are presented in the course of this section.

2.2.1 Product Development Process

The rapid development of new technologies, the increasing requirements of customers and the intense competition on international markets are a big challenge for companies. Organisations are forced to create their products customer-oriented, with high quality, as well as cost and time-effective. (Schäppi, 2005, p.5)

To cope with these demands, a clearly defined PEP is needed, whose arrangement and organisation is gaining greater importance. This process must guarantee that by the end of it, a vehicle is produced just in time, which meets the needs of customers and achieves the yield return of the OEM in order to secure its competitiveness. (Braess et al., 2013, p.1134)

In the literature, a variety of models exists which all represent this process. In addition to the focus on its purpose, a phased structure is common to all these. Figure 2.1 shows three examples of such process models from literature.

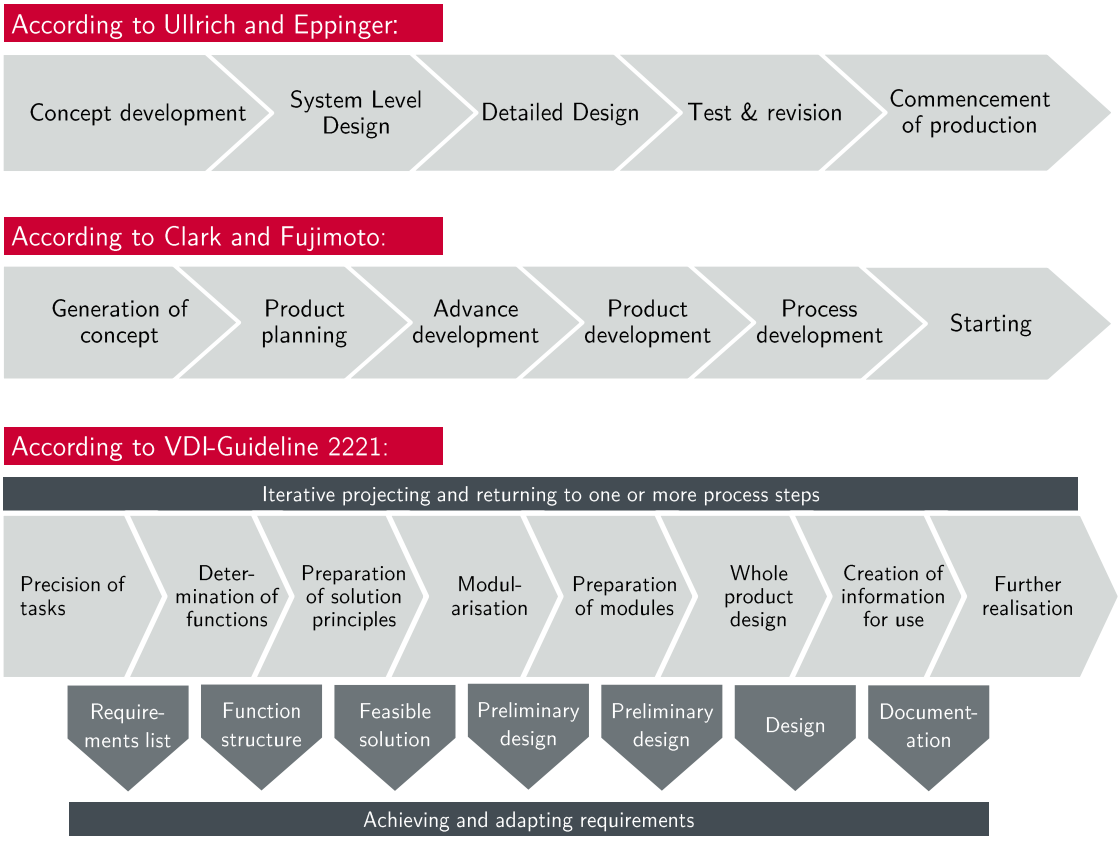

Figure 2.1: Overview of Different Product Development Process Models, cf. (Schömann, 2012, p.82)

These models vary visibly in the quantity and appellation of the different phases as well as in their

logic of sequence. While Ulrich and Eppinger as well as Clark and Fujimoto suggest a sequential sequence of particular phases, the model of the Association of German Engineers (VDI) Guideline 2221 has an iterative character. Sequential models often reach their limits because the knowledge concerning specifications and solutions is generated in the course of the development. (Schömann, 2012, p.82)

2.2.2 Model of a Product Development Process in the Automotive Industry

The particular OEMs in the automotive industry use different processes for vehicle development (Braess et al., 2013, p.1134). For that reason, Schömann (2012) describes in his thesis a model of a PEP which forms the basis of the processes from the different OEMs. This model provides an overview of a PEP illustrated in figure 2.2. It consists of six phases which are described as follows (Schömann, 2012, p.87-89):

- **Advance development and product planning**, which are independent from particular vehicle projects, form the basis and the starting point of the development process. In this phase, the product ideas are compared with the corporate, product and innovation strategy. Afterwards these ideas are prioritised and conveyed into a development request. Furthermore, the first basic conditions of the vehicle project are determined, such as product contents, number of units or appointments for market launch. Moreover, innovations are retrieved from advance development at this stage and assigned to the individual vehicle projects in accordance with the innovation strategy.

- The **definition phase** is divided into the definition of targets and concepts. It represents the first phase with relation to a specific vehicle project. By means of the results of the phase before the determined product contents and functions are transformed into requirement lists for the total vehicle. Furthermore the "emotional" character, mostly derived from the design is defined. In this phase the fixation in terms of time and content is determined using a milestone plan that forms the end of the target definition. In the course of the concept definition the specification sheet of the vehicle is prepared in due consideration of further market and competitor investigations.

- The next phase is about **product development**. Here, the concept and serial development take place. The goal of concept development is to hand over a concept for components and modules without conflicts of objectives to serial development. For that purpose, the product contents and functions, defined in the specification sheet are transformed into technical solutions. The conclusion of concept development is constituted by the determination of the concept for the total vehicle and the "*Design Freeze*" involved.

  The serial development is responsible for the completed and detailed product and process

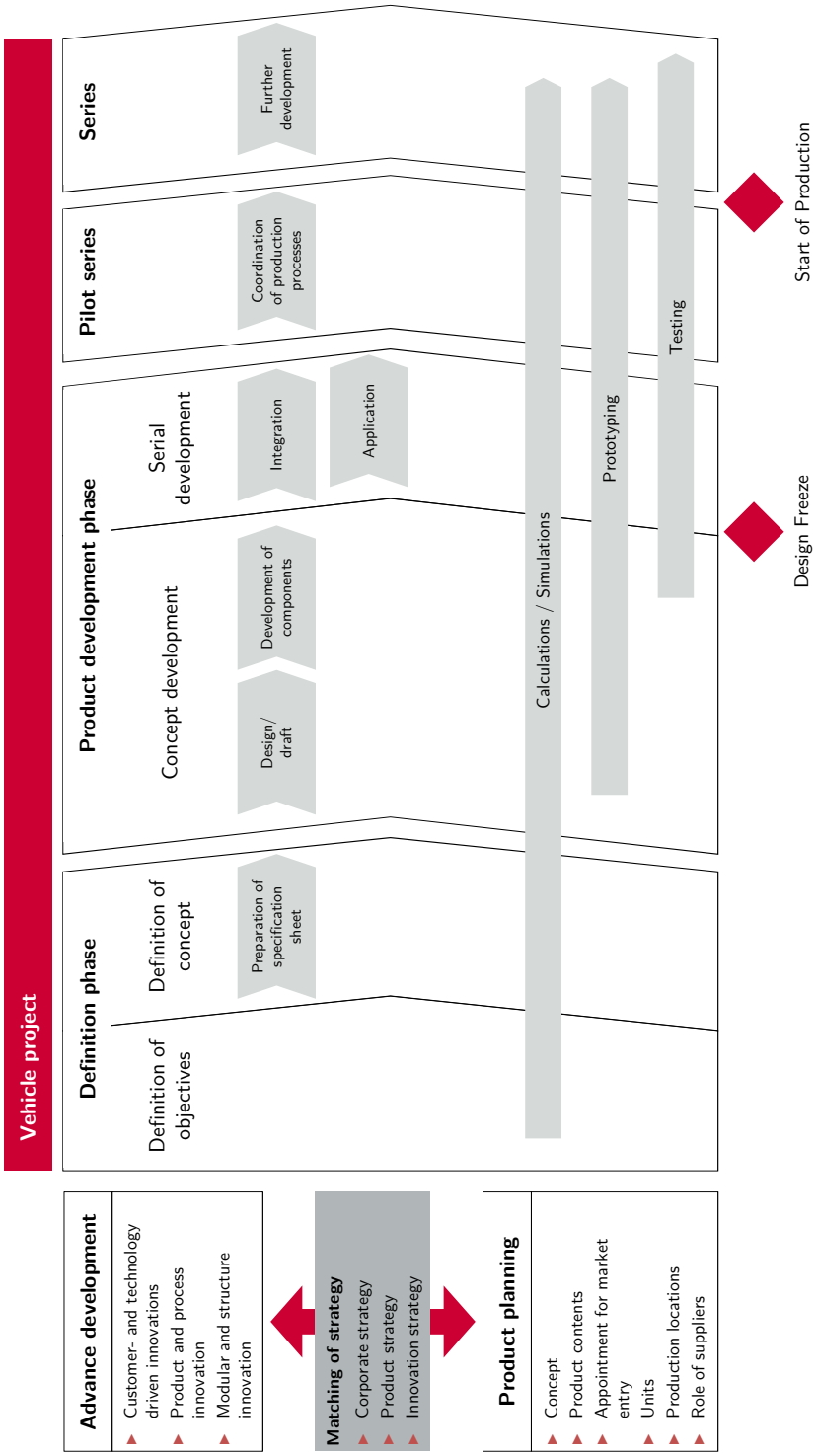

Figure 2.2: Model of the Product Development Process in the Automotive Industry, cf. (Schömann, 2012, p.88)

description on component level. The diverse modules and systems are adapted to the vehicle and in addition harmonised within. Moreover, testing and safeguarding of modules and systems takes place and manufacturing plans are prepared.

- The last phase before Start of Production (SOP) is called **pilot series** and serves as production preparation. It starts with the release of the total vehicle. In this phase the pilot cars are manufactured under near-series conditions in order to synchronise the production processes under real conditions.

- The **serial production** starts with the SOP and for the time being with a reduced number of units, which is gradually increasing. The supporting processes such as testing and pre-commissioning inspections are continued in parallel in order to support the further development of the vehicle. The further development includes consecutive measures for the optimisation of quality, reduction of costs, elimination of errors, product improvements (so-called face-lifts), etc.

2.2.3 Characteristics of the Early Phase of Product Development

In consideration of the PEP in figure 2.2 the focus of the present thesis is on the phases from advance development and product planning to concept development. In the literature this phase is also called early phase, fuzzy front end, phase zero, etc. (Verworn, 2007, p.8).

> *"The greatest differences between winners and losers were found in the quality of execution of pre-development activities".* (Cooper and Kleinschmidt, 1993, p.26)

2.2.3.1 Definition and Significance of the Early Phase

Due to the constantly decreasing life cycles of products, the realisation of a short development time becomes more and more important for companies (Verworn and Herstatt, 2007b, p.113). The early phase offers an enormous potential for optimisation in the further course of the process, due to the existing degrees of freedom (Krause, 2006, p.99). It is often described as "fuzzy", because the approach is very dynamic and unstructured and it is often ambiguous who is involved and to which extent (Gerybadze, 2007, p.200).

The early phase includes all activities starting from the first impulse respectively the first opportunity of a new product or service, up to the go/no-go decisions for implementation and therefore for the beginning of the real development. Thus, the time-based delimitation turns out to be difficult. While the end of the early phase is determined through a time fixed decision, the beginning cannot be clearly defined. It is often caused by an impulse of technical progress, by changed or new

customer requirements or by the market launch of a new product from competitors. (Verworn, 2007, p.8)

Herstatt and Verworn (2007, p.430) mention that the guideline for the whole project is defined in the early phase whereby effectiveness and efficiency are significantly influenced. The sooner it is possible to identify and to tackle potential problems as well as to overcome doubts, the sooner so called costly *"fire service actions"* can be avoided in the further course of the project (Verworn and Herstatt, 2007a, p.373), (Gassmann, 2006, p.16). On these grounds, all concerned functions and departments in a company should be integrated as early as possible in the early phase of the PEP in order to minimise potentials of conflict, to create a common understanding and to build confidence (Verworn, 2005, p.20). This is due to the fact that often-times no clear responsibilities are defined and the diverse functions and departments pursue different objectives (Khurana and Rosenthal, 1998, p.66-72).

Despite the aforementioned importance of the early phase, a low awareness of this subject on the part of top management can be discovered (Moenaert and Souder, 1990, p.72). Also Cooper (1988, p.241) indicates that often the attention of top management and resources is given to the later phases of product development. The early phase is neglected in the majority of cases.

Moreover, the elapsing information processes are very complex and mostly consist of a broad range of tacit knowledge (Khurana and Rosenthal, 1998, p.72). The complexity of information processes results from high uncertainty in the early phase, which can come from insecurity if an idea is technically feasible and if a market exists for it (Kim and Wilemon, 2002, p.270), (Verworn, 2005, p.33). Thus, one big challenge of the early phase is handling with uncertainties the identification of initially undetermined customer needs and their transformation in appropriate problem solutions. Hence, a detailed technology scanning and an early involvement of the market side is already needed at the front end. (Holtorf, 2011, p.20)

Many times, an insufficient execution of the early phase in practice is criticised (Cooper, 1988, p.239), (Kim and Wilemon, 2002, p.269). Thereby, the required resource management is low during the early phase in most of the industries. However the impact on further process and result is high (Cooper, 1988, p.241), (Verworn, 2005, p.34). Therefore, companies can take advantage of the "leverage" of the early phase and lay the cornerstone for successful product development (Verworn, 2005, p.34).

2.2.3.2 Options for Structuring the Early Phase of Product Development

For structuring the early phase, a lot of possible models can be found in the literature.

It is important to establish an efficient process in the early phase, which certainly should provide sufficient free space for the creativity of employees as well as enough flexibility to be able to be

responsive to the changes of general conditions, such as new customer needs. Besides the structure, the arrangement of the co-operations inside and outwards also plays an important role, especially the integration of customers. The early involvement of the customer is the basis for a successful product development. The model must contain the involvement of external knowledge and must clearly address appropriate co-operations and areas of responsibility. (Sandmeier and Jamali, 2007, p.342-343).

In the further progress of this thesis a short overview of potential models for structuring the early phase is given.

Khurana and Rosenthal (1998, p.59) emphasise in their model, shown in figure 2.3 , the importance of an activity, preceding the actual project, called "Pre-Phase Zero" as well as two project-specific activities "Phase Zero" and "Phase One".

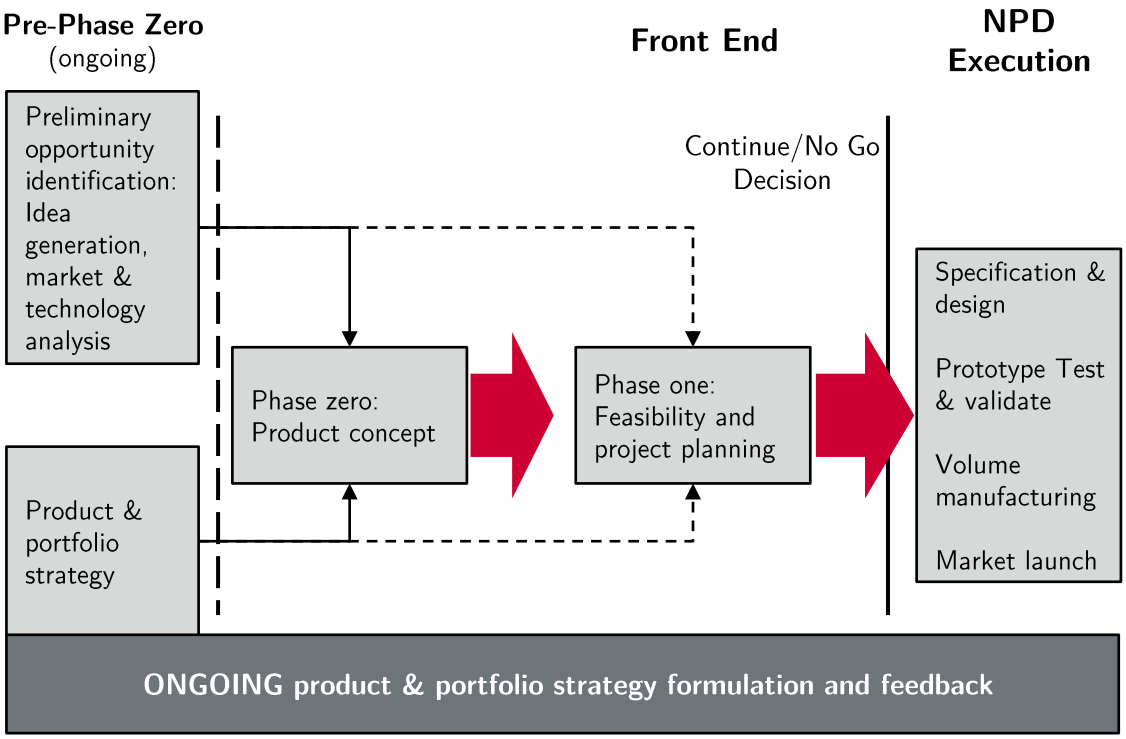

Figure 2.3: Process Model for the Early Phase from Khurana and Rosenthal, cf. (Khurana and Rosenthal, 1998, p.59)

The process starts with two inputs. On the one hand, new ideas are generated through technology and market analysis. On the other hand they point out the significance of formulating a strategic vision and an accurate planned product portfolio. These ideas are followed up using a team in "Phase Zero". "Phase Zero" provides a product concept that contains an analysis of customer needs and of competitors, a market segmentation and an adjustment of plans already in existence. In "Phase One" technical and economic feasibility is checked and a project plan is prepared. The

early phase ends with a go/no-go decision. Afterwards the proper development of the product starts. (Khurana and Rosenthal, 1998, pp. 59-60)

This process model tends to describe the development of incremental product innovations, which can be acknowledged by the conduction of market and competitor analysis. (Khurana and Rosenthal, 1998, p.70)

The Stage-Gate-Process from Cooper and Kleinschmidt has formed the research and the practise. This process fragments the innovation process into single steps, which are sequentially passed through and are separated from each other by gates (Cooper and Kleinschmidt, 1991, p.137-138). At these gates, a decision is made on whether the project should be continued or not (Cooper, 1994, p.4). The advantage of the Stage-Gate-Process lies in the clear understanding of the approach and targets, which must be achieved at the gates (Verworn and Herstatt, 2007b, p.117).

Figure 2.4 represents a Stage-Gate-Process for the early phase.

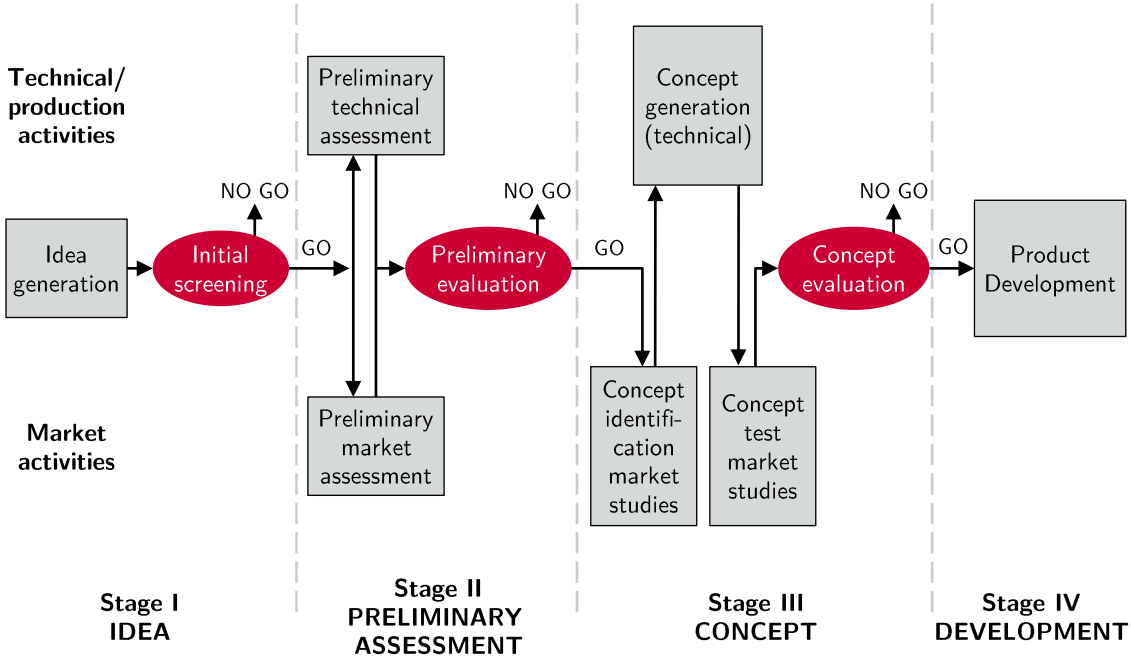

Figure 2.4: Stage-Gate-Process for the Early Phases, cf. (Cooper, 1988, p.243)

The first stage involves generating new product ideas. In a first screening decisions are made about initial and limited resources in order to prove project's visibility and potential. In stage two, a preliminary assessment of markets and technologies regarding the feasibility of the project takes place. Due to the depth of information, it is decided at a second gate whether the idea is to be developed into a concept or not. The third stage is about concept development using all information from the stage before. After a technical concept has been developed to implement the idea, market surveys are conducted in order to determine its acceptance in the market. The concept evaluation

is the final go/no-go decision point prior to moving into product development. (Cooper, 1988, p.242-246)

The main criticism of the Stage-Gate process regards its sequential design. Therefore, it could come to delays in the process because missing information at the gates will hinder the continuation of the project. (Verworn and Herstatt, 2007b, p.118)

Hence, even Cooper (1994) suggests a third generation of the Stage-Gate-Process, that improve all deficiencies of the two generations before. By the third generation the gates are not as strict and an overlapping of the phases is possible.

A further model is described by Sandmeier, Jamali, et al. (2004) (see figure 2.5). As the other models from Khurana and Rosenthal (1998) and Cooper (1988) it is divided into the identification and analysis of potential opportunities, the generation of ideas and the creation of a product concept or a business plan respectively. Also in this model, each phase ends with a go/no-go decision. The first phase ends with a decision about which search field should be followed. After the generation of ideas, one or more promising ideas are selected. The decision about whether the project is followed up or not follows the creation of a product concept based on a feasibility study. Parallel to the whole process a linkage to internal and external knowledge exists. The front-end process model should be a support to solve poor structural problems using good structured sequences. (Sandmeier, Jamali, et al., 2004, p.5-6)

The illustrated process from Sandmeier, Jamali, et al. (2004) should be consulted in the framework of this thesis for developing a structured front-end approach.

In the literature further structuring approaches and additional process models can be found, which are targeted on certain types of development projects (Verworn and Herstatt, 2007b). These will not be represented in detail in the present thesis.

2.2.3.3 Potentials and Constraints of the Early Phase

As mentioned in chapter 1, an innovation project is characterised by huge uncertainties. Figure 1.1 shows that in the early phase especially, significant potentials exist in order to reduce these uncertainties in a cost-effective way and to avoid subsequent changes (Verworn, 2005, p.66). In contrast, insufficient product specifications lead to considerable and mostly expensive corrections in the further course of the project (Verworn, 2007, p.6-7). The decisions made in the early phase have a crucial influence on further steps in relation to development time, costs and quality (Jetter and Schröder, 2007, p.264).

In science there is no consensus about the benefits of structuring the early phase (Verworn and Herstatt, 2007b, p.112). Many empirical studies show a positive effect on innovation success by

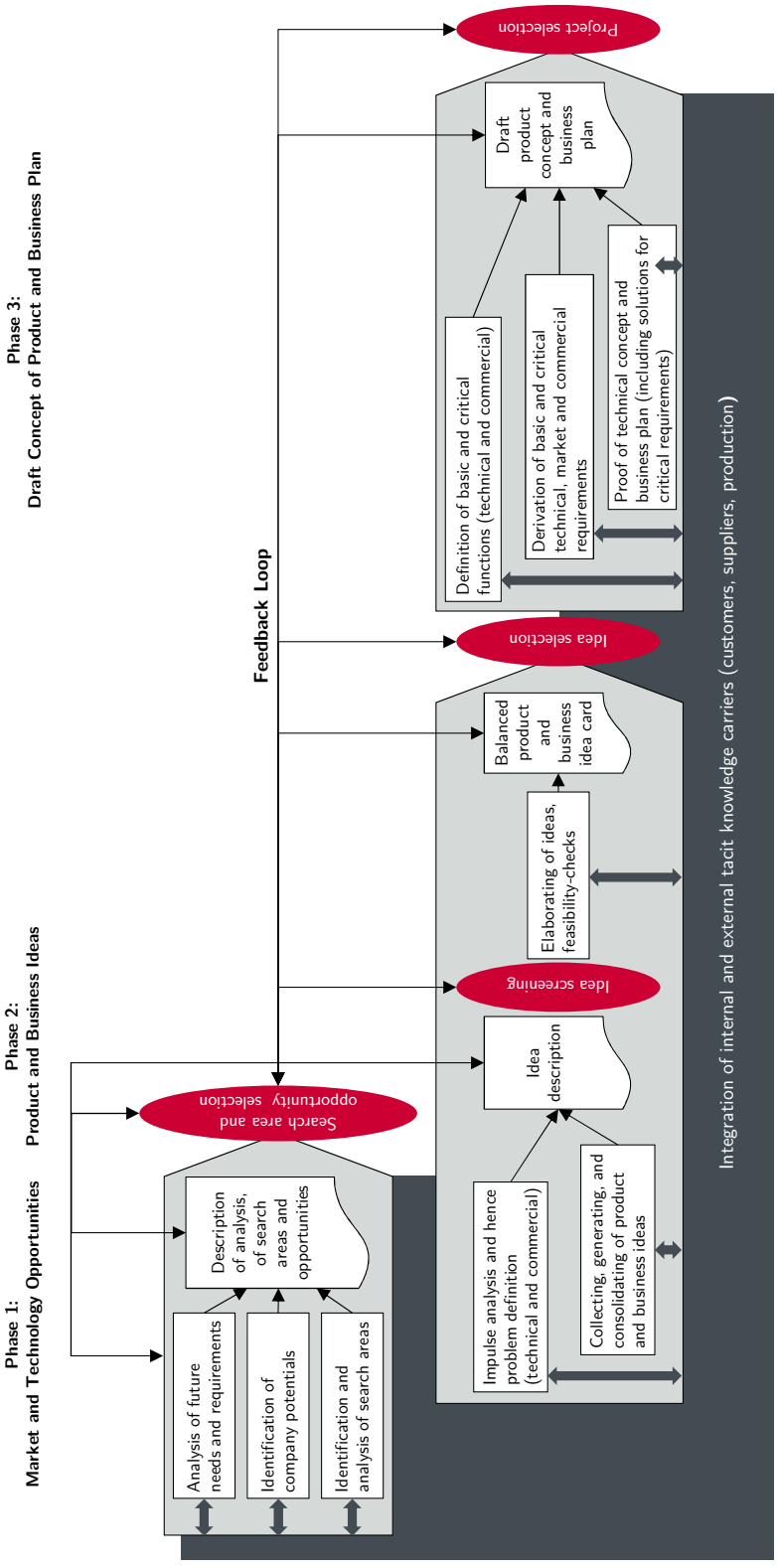

Figure 2.5: Front-End Process Model from, cf. (Sandmeier, Jamali, et al., 2004, p.6)

checking technical feasibility in the early phase (Verworn and Herstatt, 2007a, p.375). In contrast, others are of the mind that structuring the early phase is an inadequate method, because it restricts the creativity of the people involved (Verworn and Herstatt, 2007b, p.112).

In summary, the early phase is very crucial for the success of a project because mostly, omissions during the early phase of the PEP cannot longer be equalised in the later stage of the process. Therefore it is essential to strengthen the effort during the early phase by involving all functions and departments, by reducing technical and market uncertainty in order to influence the efficiency of further process in a positive way. (Verworn, 2005, p.175-179)

2.3 Customer-Oriented Product Development

The alignment of development activities with the needs and requirements of customers, that means customer orientation, is classified beyond controversy in the literature as an important success factor for product development (Yli-Renko and Janakiraman, 2008). One essential instrument of implementing customer orientation in product development is customer integration.

Wildemann (2004, p.2) points out, that customer orientation must have already begun during the generation of new product ideas by an early identification of customer requirements. The importance of customers, respectively the integration of the customer into the PEP continues to increase, which results in an adjustment of the organisation and the PEP. The early identification of customer requirements provides new challenges for companies, but has become a critical success factor in the PEP. In the course of gathering customer needs, the integration of the customer in the product development plays a crucial role.

2.3.1 The Role of the Customer in the Development of New Products

Customers are able to assume different roles in the development of new products. On the one hand this could be a passive role, where the customers convey their needs and requirements ("Market Pull") but on the other hand it could be an active role like an innovator ("Customer active paradigm" according to Hippel (1978)) (Reichart, 2002, p.27).

Hippel (1978) evolves two different basic approaches:

- Manufacturer Active Paradigm (MAP)
- Customer Active Paradigm (CAP)

In the MAP, manufactures have the active role to search for the demands of customers and to develop a responsive product idea. According to Hippel (1978) MAP is widespread, especially

Figure 2.6: Manufacturer Active Paradigm, cf. (Hippel, 1978, p.40)

in the consumer goods industry. There, numerous methods are developed, in order to seek out customer needs and to generate product ideas according to these demands.

At the CAP, the customer develops an idea for a new product and selects a manufacturer making the product. The task of the manufacturer in this paradigm is to screen the ideas for new products and to choose those with the best chance of success from the manufacturer's point of view.

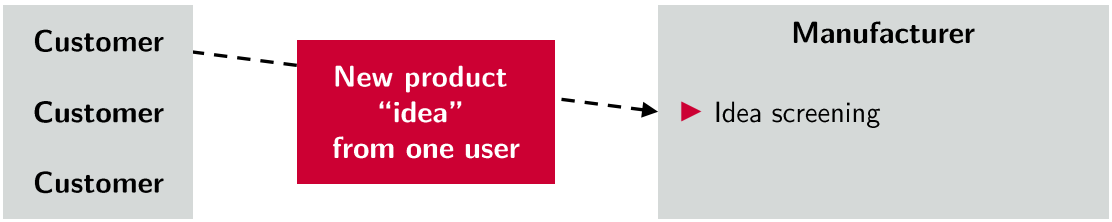

Figure 2.7: Customer Active Paradigm, cf. (Hippel, 1978, p.40)

Hippel (1978) mentions that CAP is mainly found in the capital goods sector. In contrast to often latent customer needs of consumer goods, the customers know their needs in the field of capital goods and are able to develop their own solutions.

In further course, this master's thesis concentrates on the MAP because the customer has a passive role in the PEP of AUDI AG. Thus, Audi conducts different studies to identify the needs of customers. In literature, this is also described under the theory "Market Pull", which disagrees with the theory of "Technology Push" (Reichart, 2002, p.27). Referring to innovations, these two theories purport the strategic direction of a company at the interface between R&D and Marketing & Sales (Herstatt and Lettl, 2000, p.2).

The "Market Pull" concept assumes that innovations have their origins in the latent customer needs of the market. The identification of such requirements is the beginning of the development. (Chidamber and Kon, 1994), quoted by (Herstatt and Lettl, 2000, p.2)

Gerpott (2005, p.41) describes "Market Pull" as new features that are in demand from market. This often results in incremental innovation, as companies identify unsatisfied customer needs and take account of those through a modified product.

"Technology Push" means that emergent technologies or new combinations of existing technologies are a catalyst for innovative products. This usually leads to radical product innovations which create new markets in the extreme. (Herstatt and Lettl, 2000, p.2)

The problem of "Technology Push" projects lies in very high market uncertainty. The result for technology-driven companies is the need for a stronger "Market Pull" in order to develop processes and methods to effectively reduce this uncertainty and to integrate those into the company. (Herstatt and Lettl, 2000, p.19-20)

Thereby another common problem of engineering, the "over-engineering", is minimised and products are aligned with customer needs (Stern and Jaberg, 2010, p.158-159).

Plinke (1990), quoted by (Wildemann, 2004, p.3) points out, that "over-engineering" and realising wrong specifications are ascribed to a discrepancy between perceived and actually required customer benefits, which leads to misinterpreted expectations of customers. Thus, an involvement of the voice of the customer into the PEP is essential, because a wrong understatement of the customer needs can have a negative influence on company's success.

Therefore, the level of information related to customer requirements must be widespread inside the company in the framework of product development. Thus, it is vitally important to anticipate the concrete attributes of product designs early on and to anticipate functionalities as well as customer values. This is because successful innovations are characterised by having qualities that the customer is not aware of or is not able to articulate. (Wildemann, 2004, p.2)

2.3.2 Approach of Customer Integration into the Product Development Process

Choosing the proper point in time to integrate customer needs into the PEP is crucial. At the beginning of the PEP, especially in the phase of product definition, the involvement of customer requirements is essential. (Stern and Jaberg, 2010, p.159)

In the automotive industry, the phase of product planning starts with a detailed analysis of future customer demands as they will be represented at the time of SOP. Then, product ideas are derived from customer needs, which flow into the attribute spectrum of the vehicle to be developed. On the one hand this is based on customer needs, on the other hand, the long-term goals of the brand must be ensured. The core values of a brand must be experienced by the customers in the products in order to secure long-term authenticity of the brand. (Braess et al., 2013, p.1139-1140)

Since these values are difficult to compass and to make transparent, the use of product attributes is necessary. Therefore, it is very important to define and to classify particular product attributes at the beginning of a new project. (Schuh, 2013, p.35-36)

In conformity with Albers (2007, p.365) a product can be understood as a set of attributes. Accordingly, a product can be defined in terms of its attributes. Consequently, a large number of different products and services can be described on the basis of expressions of characteristics.

The objective of product definition is to define a complete description and specification of all requirements and tasks, which must be fulfilled by the product later on (Voigt, 1998, p.165). Therefore, determined customer requirements must be translated into a technical product profile using appropriate methods (Wildemann, 2004, p.6).

In the next step, a technical product profile is created in the framework of concept development. The task of concept development is to define the vehicle in consideration of all requirements. In order to reduce development time, the concept definition starts very early and in parallel to product planning, according to the simultaneous engineering approach. Concept development must be defined as an integrated process, where all responsible areas along the PEP need to be involved. This is important, because a good concept lives from successful compromises, which are worked out in the concept phase and which shall be borne from all participants in further development process. Furthermore, platforms and modular tool-kits gain importance. They must be considered in the course of concept development, because that is where the basic points of the vehicle are fixed. Therefore, all the specifications of all integrated vehicle derivatives must be known, because the modular tool-kits purport decisive design parameters. (Braess et al., 2013, p.1143)

Subsequently, the crossover to serial production takes places, which involves the whole technical product development to the point of a marketable, high-engineered and field-tested product (Wildemann, 2004, p.7).

Up to the determination of the specification sheet, customer requirements play an especially decisive role because afterwards, the changes and adaptations of development goals would only be possible with a considerable financial outlay. This means that in the framework of serial development, the influence of the customer is reduced to advices concerning relevant topics. During the serial development, something like a control system must be installed to balance whether the technical solutions fit to customer requirements, in order to guarantee a customer-oriented development. It should work like an early warning system to trigger the significant changes of customer needs into the PEP. (Stern and Jaberg, 2010, p.159)

2.3.3 Instruments for the Implementation of Customer-Oriented Product Development

Due to the fact that a customer has limited capacity to express concrete product innovations, improvements or adoptions, methods are essential that will support the integration of customer requirements into the PEP. These methods also serve to ensure a full coverage and fulfilment of

customer requirements along the PEP. (Wildemann, 2004, p.7)

2.3.3.1 Methods for Generating Ideas

In the literature, various methods for generating ideas and determining customer needs are described. Some techniques are listed below to provide a brief overview (Lüthje, 2007, p.43-51), (Gamweger, 2009, p.32):

- Focus groups and interviews
- Empathic design
- Lead user method
- Scenario technique
- Expert consultation

These methods are not followed up in detail in this thesis, because the focus is on the integration of already identified customer requirements into the PEP.

2.3.3.2 Methods for Concept Development

If the needs and requirements of customers are identified, innovation ideas need to be developed further into detailed product concepts. First, ideas should be evaluated and prioritised from a customer's point of view. Afterwards these should be integrated into product development.

In the following, useful methods for supporting this procedure are presented.

Conjoint-Analysis

Conjoint Analysis is a popular method for evaluating customer needs in a qualitative way. Therefore, attributes of the product along with quality requirements and functions are evaluated from the customer's perspective. Using this method, attributes which are most important for the customer can be detected and implemented during further procedure. (Lüthje, 2007, p.51) It is essential during Conjoint Analysis, to tap which input each attribute supplies to the overall product (Kuß and Eisend, 2010, p.274). The objective of Conjoint-Analysis is to inform product development about which attributes are decisive for new products and which levels these properties should have (Lüthje, 2007, p.52). Due to the fact that Conjoint-Analysis can handle a maximum of 9 attributes for comparison, this method is often not an adequate filter for complex products like a car. Therefore, a Kano-Analysis should be undertaken firstly, in order to identify the most effective competition-related product characteristics. (Wildemann, 2004, p.9)

Kano-Analysis

Kano-Analysis is targeted at identifying customer requirements and on determining those that influence customer satisfaction (Shahin et al., 2013, p.342). In the framework of customer-oriented product development in the automotive industry the Kano-Analysis is used for the structuring of customer requirements and for the prioritisation of product attributes. It especially lends itself to the application of products with a high degree of complexity, because numerous product requirements need to be managed here.

The Kano-Analysis distinguishes between three different types of product requirements which have an influence on customer satisfaction. These types are (Matzler et al., 1996, p.6-7), (Saatweber, 1997, p.47-49), (Wildemann, 2004, p.9):

- **Must-be requirements:** These requirements are basic requirements, which must be fulfilled in order to satisfy the customer. They will be assumed and accepted as self-evident by the customer. Considering the basic factors using the example of a car at the present time, a driver's air-bag would be classified as a standard piece of equipment and would be regarded as natural. Since the customer assumes these requirements, they do not explicitly demand them. Therefore, the fulfilment of these requirements does not lead to increased customer satisfaction.

- **One-dimensional requirements:** One-dimensional requirements are explicitly required by the customer and are marked expectations of the product. As these are usually demanded by the customers, they are also easy to gather. The fulfilment level of one-dimensional requirements is proportional to the level of customer satisfaction. This means that the higher the level of fulfilment, the higher the level of customer's satisfaction and vice versa. In relation to a car, its average fuel consumption or its interior noise could be mentioned here as examples of one-dimensional requirements.

- **Attractive requirements:** Attractive requirements are those that the customer feels are a useful and pleasant surprise as these are neither explicitly expressed nor expected by the customer. Customers have latent desires and needs, but they are not aware of these. Thus, customers are not able to verbally express these desires. This means that attractive requirements are as yet unknown attributes which affect and increase value and prestige. The fulfilment of these requirements leads to more than a proportional satisfaction but if they are not met, the customer does not feel dissatisfaction. Using the example of a car, exciting factors may be attributes that are not available today as well as technical features and innovations, which may not be offered by competitors at this time. It is essential that attractive requirements are not only gadgets, but that they must offer a real benefit to the customer.

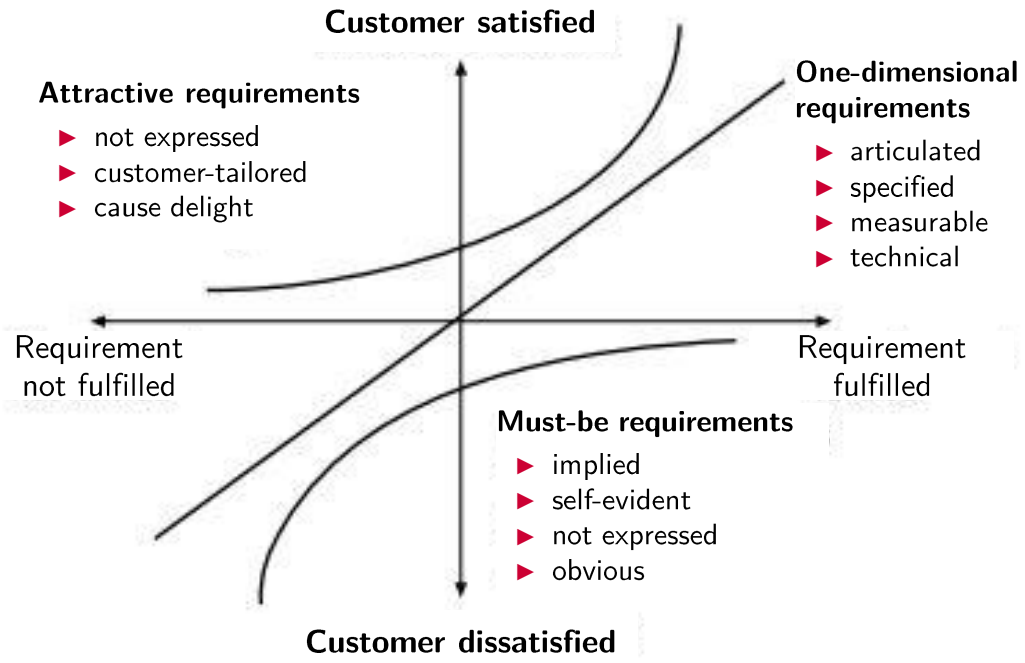

Figure 2.8: Kano's Model of Customer Satisfaction, cf. (Matzler et al., 1996, p.7)

Matzler et al. (1996, p.7-8) list the advantages of classifying customer requirements as follows:

- Product requirements can be better understood because by using this method, product attributes that have the highest influence on a customer's satisfaction can be identified.
- It serves for prioritisations in product development. Using this method, it can be decided which requirements should be invested in. For example, it makes little sense to invest in must-be requirements, which are no longer respected by customers, because they are already at a satisfactory level. It would be better to improve one-dimensional or attractive requirements, because they have a higher influence on customer satisfaction.
- Kano-Analysis supports the clarification of conflicts of objectives in the course of product development. If there is a conflict between two requirements due to technical or financial reasons, criteria can be identified which will contribute more to customer satisfaction.
- Using Kano-Analysis, one can be differentiated from its competitors because attractive requirements of the customer can be discovered and fulfilled. This is essential because the must-be and one-dimensional requirements are regarded as average and therefore interchangeable.

- Kano-Analysis can be optimally combined with the Quality Function Deployment (QFD) approach because QFD prerequisites involve the knowledge of customer requirements and their prioritisation. Due to the fact that Kano-Analysis makes a significant contribution to the identification of customer needs with the greatest influence on positive customer satisfaction, it serves as a prerequisite for customer-oriented product development.

Quality Function Deployment

The QFD method is targeted to systematically identify, evaluate and transform customer needs and requirements into measurable product characteristics (Regius, 2006, p.17). In the automotive industry, it is primarily used to transform the identified customer requirements into technical specifications in terms of measurable product parameters (Herrmann and Huber, 2000, p.9-12).

The QFD method has been currently developed to translate the *"voice of the customer"* in the *"language of the engineer"* (Akao, 1992), quoted by (Wildemann, 2004, p.10).

According to Griffin and Hauser (1993, p.2) QFD can be defined as:

> *"... a product (service) development process based on inter-functional teams (marketing, manufacturing, engineering, and R&D) who use a series of matrices, which look like "houses", to deploy customer input throughout design, manufacturing and service delivery."*

Saatweber (1997, p.26) lists some causes why QFD should be implemented into a company:

- The main purpose is to meet customer expectations for the product.
- QFD helps to create a clear technical specification out of verbal customer requirements.
- With the help of QFD a very detailed product knowledge is built up in all involved areas (marketing, R&D, etc.).
- With the aid of QFD operational cooperation is supported, because the matrix is edited together from the various departments.
- QFD is useful in order to shorten development times because later modification effort is reduced due to simultaneous project phases, and it helps to focus on the essential points.
- QFD avoids minus developments, which walk past the market.
- Product costs and investments are reduced to the required degree.

- With the help of QFD, a properly realised product and competitive analysis is supported.
- Through the systematic application of QFD, check-lists for the Technical Development are created.

The concept of QFD supports the entire product development process from concept development to SOP. The QFD approach is about answering two basic questions: What does the customer expect? How can customer requirements be met? Thus, the purpose of the QFD process, the implementation of customer requirements in coordinated targets is achieved. At the very beginning of this approach is the preparation phase 0, which is about the gathering of customer requirements. Further process is carried out in four phases, which are shown in figure 2.9:

- Product planning, concept planning
- Parts or components planning
- Process planning
- Production planning

The focus of this thesis lies especially on the first phase, the product planning. Thereby the House of Quality (HoQ) serves as a good comprehensible documentation of thinking and planning results. Figure 2.10 shows a simplified HoQ.

Customer requirements form the input parameters of the HoQ. Therefore, these must be detected as accurately as possible. In the second step, an evaluation of the own product compared to similar competitor products is carried out from a customer's point of view. In the next step, the central question is how the customer needs should be met. Hence, it is necessary to define the attributes which meet the customer's demands. The aim is to translate the *"voice of the customer"* in the *"language of the engineer"* or of the company. Here, these are not constructive solutions but merely features of (still) fictional approaches to problem solving. Then the technical targets which should be achieved are determined for each product feature. Furthermore, the direction in which a change should take place should be considered. Afterwards, the strength of the attribute is defined in connection with its target value of supporting the customer's requirement. Therefore, it is distinguished between 9 = strong, 3 = moderate and 1 = weak. The correlation matrix in the roof of the HoQ describes the relationship of the features to each other. This means that possible conflicts of objective are visible in the roof. Here, the correlation of attributes is examined in due consideration of target values and the direction of change. There, it is differentiated between very positive, positive, negative, and very negative. In the next step, a technical comparison with competing products takes place from the company's perspective. It is checked whether this assessment matches the subjective comparison of the customer's point of view, or whether there are significant deviations. Finally, the degree of difficulty fulfilling each feature with its target value is determined.

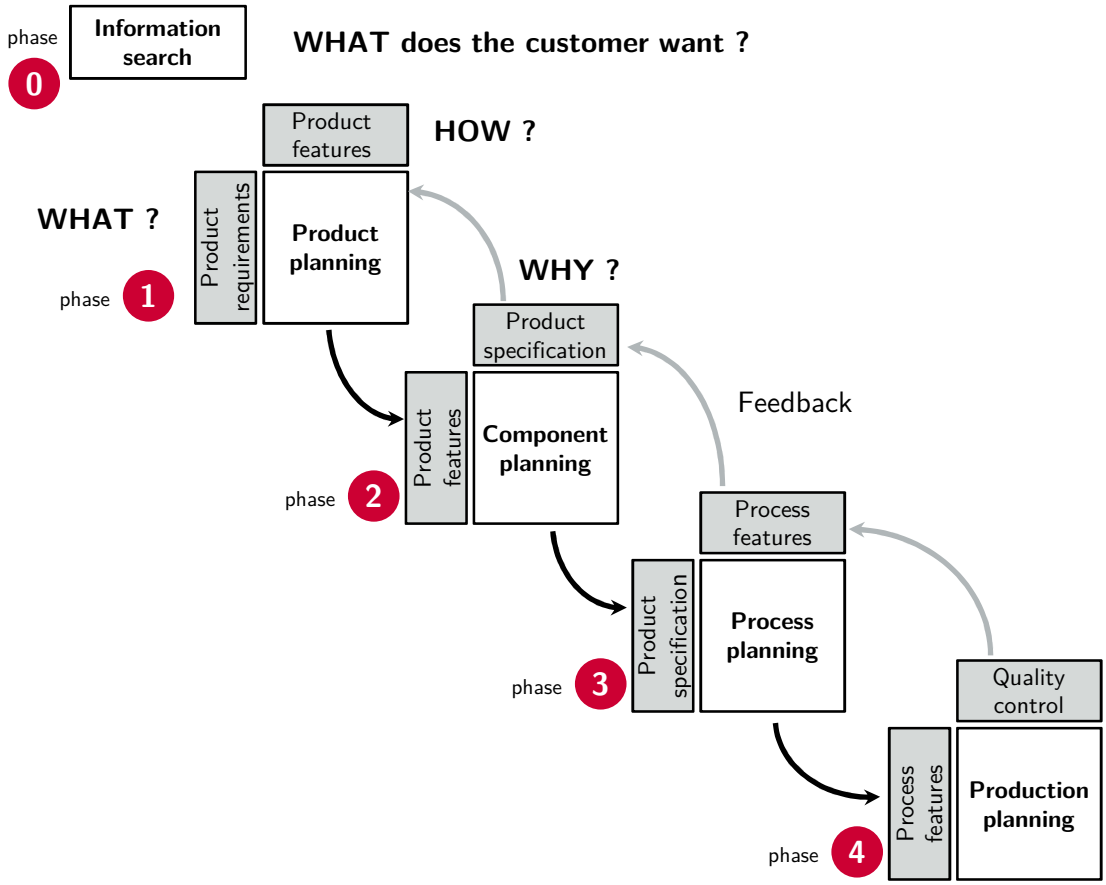

Figure 2.9: The Four Phases of the QFD Process (according to Macabe), cf. (Saatweber, 1997, p.38)

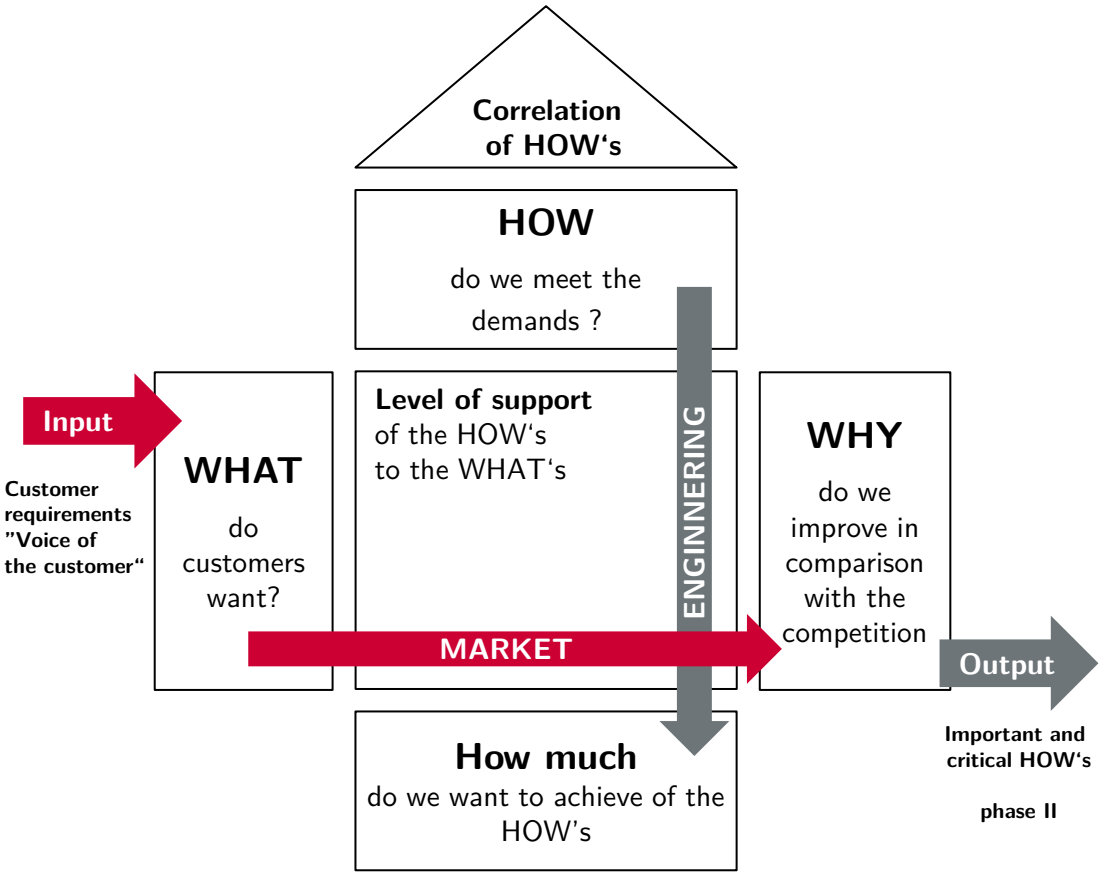

Figure 2.10: Cross Section of the First QFD-House, Phase I, cf. (Saatweber, 1997, p.35)

3 Customer-Oriented Product Development at AUDI AG

In this chapter, customer-oriented product development based on the brand and product strategy up to component requirements at AUDI AG is considered in detail. In the first instance an overview of product development is given and in section 3.2 customer orientation at AUDI AG, including Customer Process, is elaborated.

3.1 Product Development at AUDI AG

The objective of this section is to provide an overview of product development at AUDI AG. At the beginning the organisational form and the project organisation are considered to provide a better understanding. Afterwards the PEP of AUDI AG is described to clarify which parts of the process are important for the present thesis. These are innovation management, product planning and concept development which are all considered in detail at the end of this section. In addition, an overview of the methods used in the phase of product planning is given.

3.1.1 Organisational Form

AUDI AG is cross functionally organised in the areas involved in the Product Development Process (PEP) such as almost all other major OEMs. On the one hand, there are the line departments which are oriented at classical vehicle components like aggregates, platform, electrics and the development of attributes of the complete vehicle. On the other hand project-oriented managerial areas of responsibility exist, which drive the PEP. The product managers at Audi are responsible for projects as well as processes and focus on the coordination of these. The professionals involved in the process are allocated by area of expertise to individual lines and the line management bears responsibility for the different attributes (see figure 3.1). The task of the project managers is to organise the networking of line departments, to drive the project and to monitor its progress. The line-oriented organisations retrieve the risk of long decision-making cycles and a heavy burden of decision-makers in line. Their advantage is the high-level integration of technical solutions and attributes. (Braess et al., 2013, p.1134-1136)

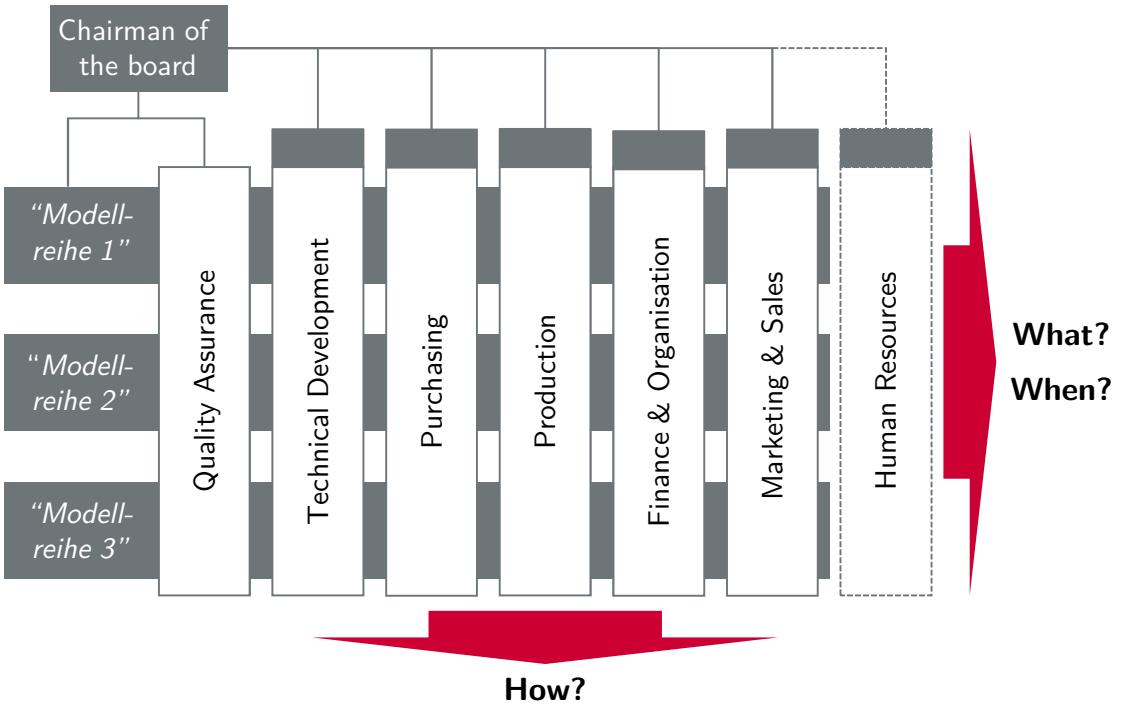

Figure 3.1: Organisational Form of AUDI AG, cf. (Braess et al., 2013, p.1135)

3.1.2 Project Organisation

An efficient organisation requires a cross-functional mapping of the participating divisions in the PEP. The highest decision-making body is a committee, consisting of management board and top management. Hierarchically below these bodies, the Product Planning Team and the Steering Team make the necessary decisions, graduated according to the level of the task (properties, cost, effort, schedule). Figure 3.2 clarifies project organisation at AUDI AG. A product manager or later in the PEP a project manager leads the vehicle project neutrally, because he/she is located outside from line departments and directly reports to the management board. His/her Product Planning Team (PPT) and later in the process his/ her Steering Team consists of representatives of diverse line departments. (Braess et al., 2013, p.1137)

Below this level, a simultaneous-engineering structure exists, which is divided into so-called *"Teams of Experts"*. These Teams of Experts are set up according to the following assemblies of a car. Inside these teams, product attributes, costs and due dates related to components are processed.

- Aggregate
- Chassis
- Body
- Interior equipment

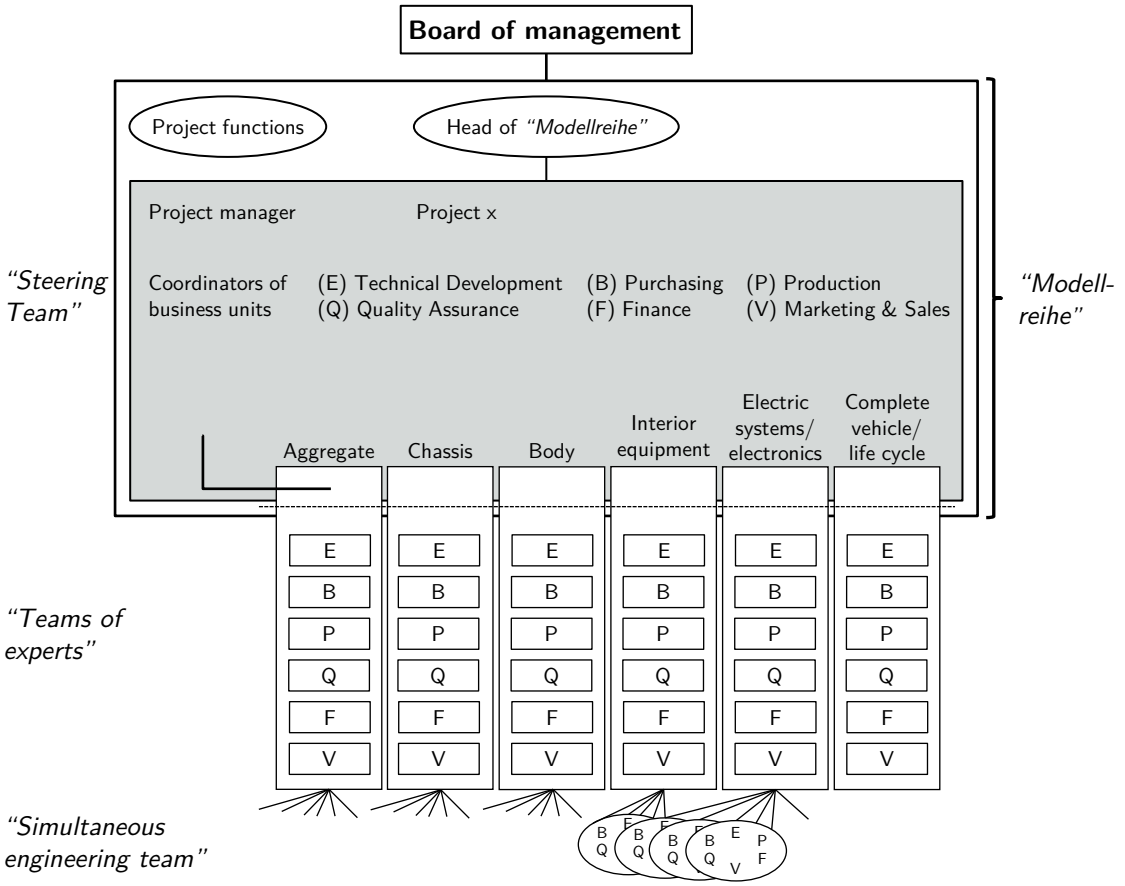

Figure 3.2: The Project Organisation at AUDI AG, cf. (Braess et al., 2013, p.1138)

- Electrical systems/electronics
- Complete vehicle/ life cycle

The so-called *"SE (simultaneous-engineering) teams"* are firmly established in the PEP and are composed of members from diverse business divisions. These teams are responsible for the realisation of all requirements at component level. (Braess et al., 2013, p.1137)

3.1.3 Overview of the Product Development Process

A continuous PEP with a corresponding milestone structure for temporal alignment is a prerequisite in that such organisational structures can focus the product development and its progress. The PEP also called Master Product Process (MasterPP) at AUDI AG provides a basis for the regulation of project phases with regard to deadlines and contents. It contains different milestones, where the compulsory project status must be achieved. For a better understanding, the MasterPP is divided into diverse levels of action, which represent the processes and tasks of the particular business divisions. All contents and milestones in the MasterPP are geared to the SOP and are declared with time left in months up to this point in time.

The MasterPP consists of three different phases: product planning, product development (serial development) and product updating (supervision of vehicle series production and model updating). Figure 3.3 outlines the PEP schematically.

A more detailed temporal delimitation of the MasterPP is shown in figure 3.4.

The Start of the Project (PS) is initiated based on the cycle plan. The cycle plan provides an overview of the planned market launches of future vehicles. A first exchange of ideas between management and project managers takes place and the work of the appropriate project team starts. At milestone Product Feasibility (PF), the basic data of the vehicle and the project are presented to the management board. At the milestone Decision of the Concept (KE), the concept is decided and hence, it defines the transition from the concept to serial development. The design of the vehicle is fixed at Design Freeze (DF). (AUDI AG, 2013a)

The MasterPP of AUDI AG basically represents a standard procedure, but also allows some anomalies in the time-line for example, due to the definition of a platform or a great idea from a designer. Therefore, the start of the product planning is flexible, but it is important that the vehicle project is fixed to an appointed date and that it is feasible. Contrary, the serial development at Audi is designed as short as possible. There are several reasons:

- The later the design decision the more recent the design is. A good design has to mature and the best design ideas always come relatively late in the process.

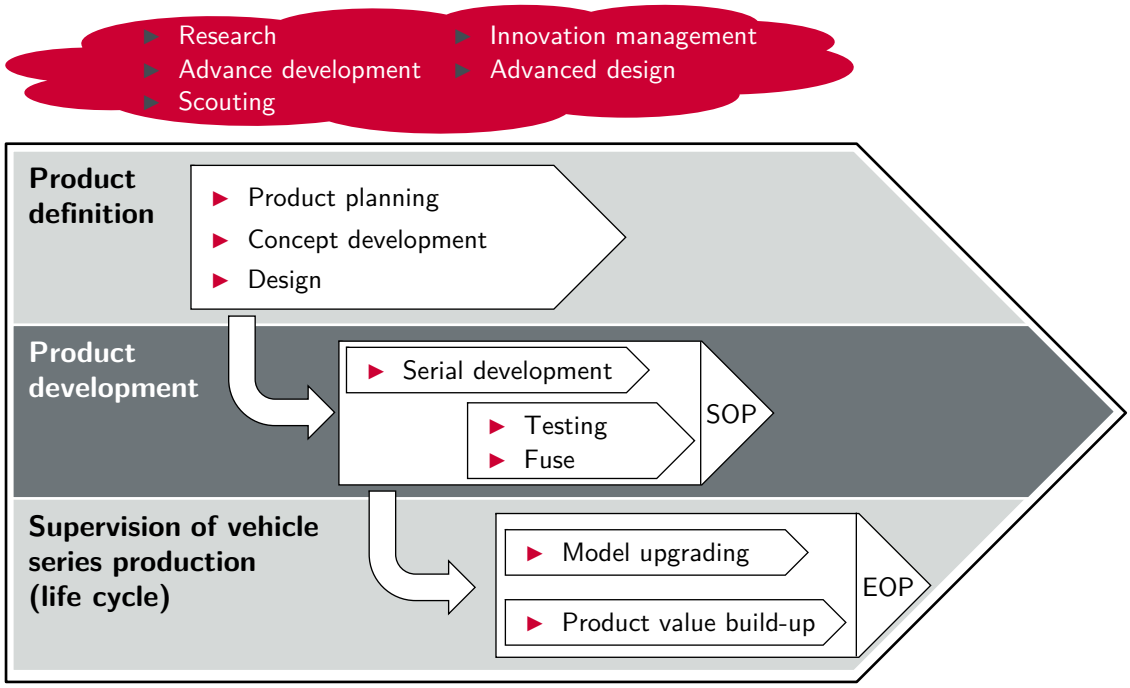

Figure 3.3: Schematic Product Development Process, cf. (Braess et al., 2013, p.1135)

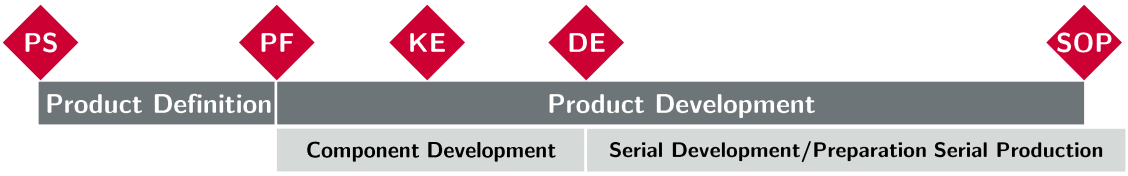

Figure 3.4: Scheduling of the MasterPP, cf. (AUDI AG, 2013c)

- In the series development, a proportional relationship between time and money exists, therefore Audi tries to keep the series development as short as possible in terms of cost saving.

- As the series development is very time consuming, it also obligates a large number of employees, which are needed as quickly as possible for follow-up projects.

After the design decision (milestone DF), which plays an important role for a premium manufacturer because it has to communicate the character and prestige of the brand, the serial development starts. Here again, changes in the flow are possible due to the good ideas of designers, which is usually the case. To make this possible, it is assumed that all non design-relevant scopes of development do not exceed a manageable size. The prerequisites for this have to be defined in the phase of product planning and have to be passed bindingly. Therefore, the early phase and its exact organisation becomes more and more important, since it has a high influence on outcome or process stability (see figure 3.5). (Braess et al., 2013, p.1137-1139)

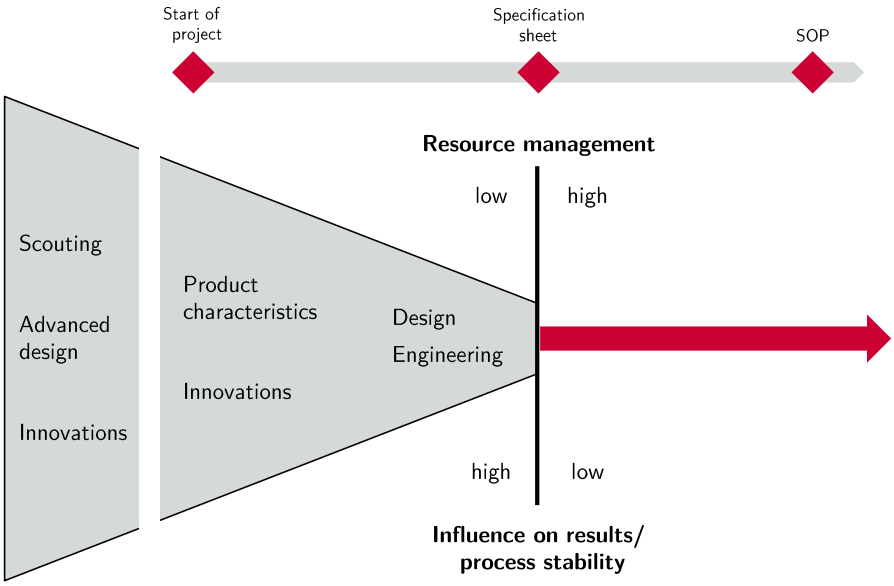

Figure 3.5: "Early" Process Organisation, cf. (Braess et al., 2013, p.1139)

3.1.4 Innovation Management

In addition to the targeted positioning of the vehicle regarding brand image, design, product attributes and price, innovations also play a crucial role for an attractive offer. Especially at technology-oriented brands, such as Audi, whose brand value is especially defined through innovations such as the all-wheel-drive concept named "quattro" or the Aluminium Space Frame.

Innovations provide an additional value for the credibility of the brand essence *"Vorsprung durch Technik"*. Therefore, it is crucial that innovations are sustainably identified with the brand in order to strengthen them. As a negative example, the innovations Anti-lock Braking System (ABS) and Electronic Stability Control (ESC) can be mentioned here, because today customers can no longer associated them with a manufacturer, therefore these are no longer able to contribute to the strengthening of a brand. That means, two aspects are important in the context of innovation management, first of all to generate innovations but also to maintain them and to pull them together with the brand. (Braess et al., 2013, p.1141)

The Oliver Wyman-study "Car Innovation 2015" shows that innovations are one of the most important success factors of the automotive industry (Wyman, 2007, p.4). Therefore, the OEMs are reliant on the implementation of innovations. Disselkamp (2012, p.92) describes that the development of innovations can be specifically fostered and managed and is therefore not left to chance.

Therefore, innovations at Audi are planned long-term. This happens in a regulated process in the front of the PEP and parallel to it. Nowadays, the ideas are systematised and focused on the essence of the brand and the Attribute Profile (see section 3.1.5). The process of idea generation runs constantly and is detached from vehicle projects.

In the next step, an evaluation in respective of the prioritisation of ideas takes place, in order to release them for further development. This prioritisation occurs once per year. Then, in the course of advance development, the engineers try to integrate the approved ideas in a vehicle environment with the aim of reviewing the potential of the attributes and to prove their ability for serial development. In this phase, it is crucial to already involve the SOP-developer to confirm the capacity for serial development so that innovations are obligated to be implemented into the vehicle project. In order to have the right innovation for the right vehicle, advance development must be based on the schedule of the target vehicle (Braess et al., 2013, p.1141-1142). However, expert interviews for the stakeholder analysis show that this is not the case at AUDI AG.

3.1.5 Product Planning and Concept Development

> *"The customer is the measure of all things."* (author's own translation, Braess et al., 2013, p.1139)

Hence, product planning begins at Audi with an analysis of customer needs, as they will be constituted at the time of SOP. For this purpose, analyses are performed on the one hand, which use the expertise developed at Audi in the form of strategic tools like the Ideal Attribute Profile and the Footprints. On the other hand, Audi also obtains some studies of relevant institutions. In particular it is worth mentioning New Car Buyer Survey (NCBS) studies, ethnographies,

benchmarking, trend analysis and many more. These studies will be developed for all major markets and represent expected customer behaviour. Furthermore, competitors are analysed more precisely. Another important governing factor is the strategy of the company (see figure 1.2). (Braess et al., 2013, p.1140)

The aim of Audi's strategy 2020, is to delight customers worldwide and to equip Audi for the challenges of the future along its path to becoming the leading premium brand. As shown in figure 1.2, the Audi brand has placed the evocation of customer delight worldwide at the very heart of its strategy, as the key component of its mission. In the following four areas of action, the Audi brand has defined its understanding of customer delight in greater detail (AUDI AG, 2012a, p.142-143):

- We define innovations
- We create experience
- We live responsibility
- We shape Audi

A new vehicle must also of course be planned so that it meets volume and return targets to increase financial strength and to contribute to the continuous growth of the company. A very crucial part of the planning work involves bringing these two approaches in line and taking necessary compromises. The objective of product planning is the determination of an optimum of the triangular relationship between customer, finance and technology. Product planning takes place in the Product Planning Team, an interdisciplinary group consisting of members from several business divisions, under the direction of the product manager.

The product ideas are incorporated in an Attribute Profile of the vehicle to be developed. On the one hand this profile is oriented on current customer needs, but on the other hand it must also secure the long-term goals of the brand (Braess et al., 2013, p.1140).

> *"... the brand essence "Vorsprung durch Technik" which brackets together the brand values sportiness, progressiveness and sophistication."* (AUDI AG, 2012a, p.140)

Basically, with the purchase of a vehicle, the customer acquires components and software, however Audi sold him/her emotions. Therefore, customer enthusiasm arises from an emotive experience of the attributes. (AUDI AG, 2013e, p.2)

These core attributes must be reflected in any new product and have to generate delight among customers, in order to ensure a long-term authenticity of the brand (Braess et al., 2013, p.1140).

Hence, attributes are very important, because they form the basis of the Audi brand and product strategy, and thus of the product definition of planning as well as development. Based on the brand image, which provides the basis for product development, the operationalisation respective of the breaking down of brand values takes place, from which the attributes are derived. (AUDI AG,

2013e, p.11)

The definition of a vehicle by means of attributes is understood in this thesis under the term *"Attribute Planning"*. At Audi, the term attribute is defined as all attributes which are necessary and usable for describing a vehicle. All these attributes are listed in the Audi Attribute Framework (see section 3.1.5). In order to get a feeling for which attributes are meant, some are mentioned in figure 3.6:

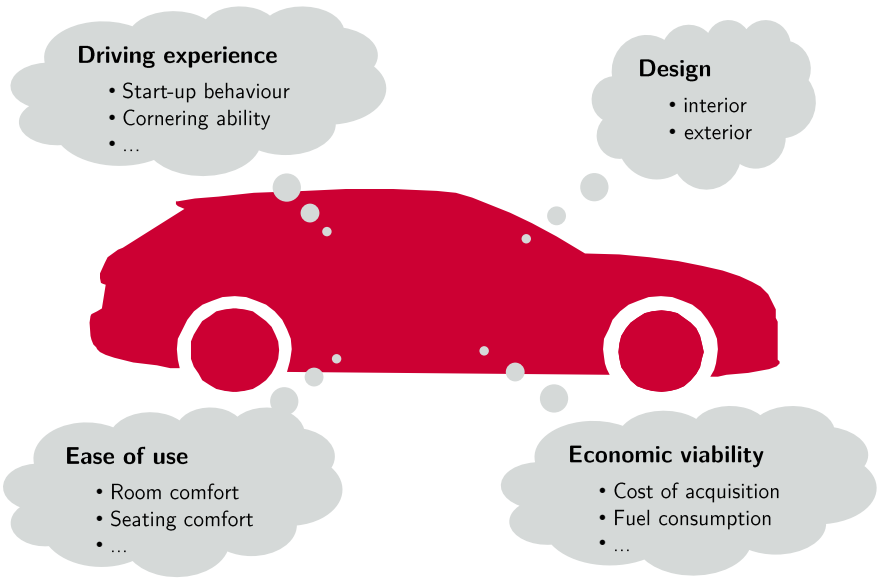

Figure 3.6: Examples of Diverse Attributes, cf. (AUDI AG, 2012b, p.3)

In the context of product planning, Attributes Planning takes place with the objective of defining a clearly prioritised profile of requirements for a vehicle. These demands should make the car be an attractive offer according to its positioning in the brand and inside the whole portfolio of AUDI AG and according to the different market regions as well as to customers. Moreover the new car should be more successful than a comparable vehicle of key competitors. Another objective of Attribute Planning is to ensure the translation as well as the quantification of these vehicle requirements into technical target values. (AUDI AG, 2012b, p.4)

Here, a few tools are needed, which will be described now in detail. Firstly, strategic tools are used for the impression of the brand as well as for differentiation to competitors. They also elucidate the classification of different concepts within AUDI AG. Afterwards Attribute Framework and Attribute Profile are explained, which are important for Attribute Planning.

Ideal Attribute Profile

The Ideal Attribute Profile is based on the brand identity. According to the brand identity, the ideal product features of all models of the Audi brand are defined. They determine the default profile that has to be recognisably implemented in the development of each product. In the context of the Ideal Attribute Profile the Audi Attribute Framework is used to visualise the prioritisation of attributes for the brand in the form of a radar chart, also called *"Eigenschaftsspinne"* (see figure 3.7) . The prioritisations describe a relation of the brand Audi to its competitors BMW and Mercedes. It provides the basis for the positioning of the vehicle, for the product planning, for innovations as well as for communication. (AUDI AG, 2012b, p.8-9)

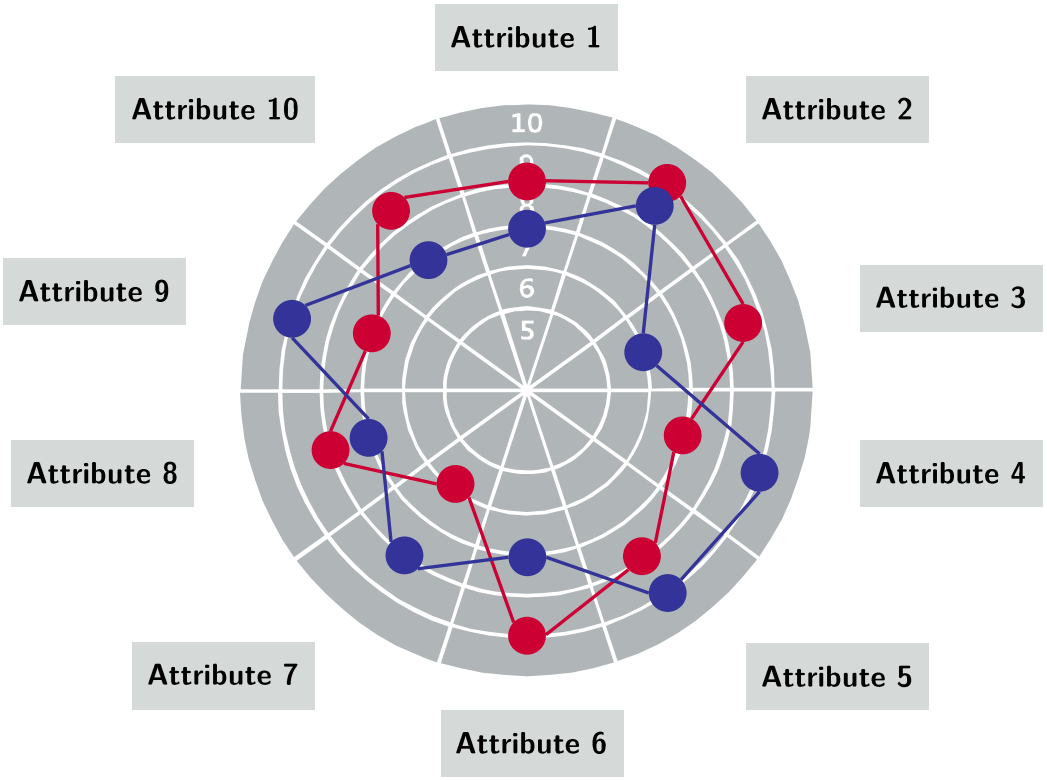

Figure 3.7: Example of a so-Called *"Eigenschaftsspinne"*, cf. (Braess et al., 2013, p.1141)

Footprints

Each car bears characteristics of Audi brand but at the same time, each vehicle has its own role within the product portfolio of AUDI AG. The range of products provides the basis for the success of a company and has the task of addressing customers' needs as well as possible. This is affected by vehicle concepts (car body shapes) that cover various customer claims within the Audi product portfolio. Accordingly, different vehicle concepts have diverse levels of attribute

specifications. In Audi's concept specifications (Footprints), the Attribute Framework is used to represent the characteristics of attributes of the different vehicle concepts in relation to each other. The specifications for each vehicle concept provide information about the importance of an attribute for the customer and as a reason for purchase and thus it is about the perfect strategic position of the vehicle concept. In summary, Footprints translate the portfolio strategy of AUDI AG into attributes. (AUDI AG, 2012b, p.10-11)

Attribute Framework

Attribute Framework represents the basis of Attribute Planning for a car. This Framework provides a table of attributes relevant for customers, structured by 3 different levels of detail. Attribute Framework forms an "internal language" for interdisciplinary communication relating to vehicle contents. The different divisions have diverse visual angles on the products and their technical content. Attribute Framework builds a bridge between the benefit before customers and the implementation into technical dimensions.

The first level of Attribute Framework contains attributes grouped into ten fields, according to how the customers experience and judge the products. These so-called Attribute Fields belong together from a customer's point of view and are crucial for purchase. Attribute Fields can be derived from customer requirements and contrary to customer demands, can be assigned/translated to these fields.

> *"Customers do not question the technical constructions of a vehicle, however they are very aware of their effects."* (author's own translation, AUDI AG, 2012b, p.6)

The second level, the level of Core Attributes, illustrates an annotation of the Attribute Fields and serves for strategic and competitor oriented positioning. It represents the main working plane of Attribute Planning and is used for communication between business divisions.

The third level is about technical attributes. Here, it is pictured with which technical measures the customer attributes of the second level can be implemented. That means, if these technical contents are changed, then the associated vehicle attributes of the upper levels are also changing in terms of their perception before the customer. Therefore, these attributes represent the working plane of the Technical Department.

In addition, responsibilities are assigned to each Core Attribute, in order to guarantee implementation and traceability.

Attribute Profile

Attribute Profile describes a precise, prospective Audi model resulting from product positioning in the product planning process. As a target profile, it provides the basis for a translation of requirements into technical data. It is represented in relation to competitors and therefore uses Ideal Attribute Profile, based on brand identity, attributes in the form of prioritisations, as well as a radar chart. Furthermore, fields of action are defined and described on the second level of the vehicle project. One objective of Attribute Profile is to secure a competition-beating product differentiation with a simultaneous avoidance of an overload regarding to contents which cannot be financially presented. Another goal is the identification of project-related fields of action. (AUDI AG, 2012b, p.12-13)

The end of product planning forms the product feasibility at the milestone PF. Up to this point the vehicle must be described in terms of features and contents. Additionally, costs must be assigned and targeted. Planned profitability must also be proofed. (Braess et al., 2013, p.1141)

Afterwards, the concept/serial development starts according to the PEP. Therefore the vehicle project is handed over to the project manager and thus to his/her Steering Team, who is responsible for the further development of the vehicle in due consideration of predetermined targets and attributes.

In parallel to product planning, concept definition begins very early in the PEP, whose task it is to define the vehicle under various requirements and to demonstrate the feasibility of its concept. In the context of concept definition, first concepts are worked out based on the analyses and benchmarks mentioned before and are triggered as input into product planning. After the vehicle has been described in the context of product planning and profitability has been demonstrated, the project is released for a further detailing of the concept. This is put into effect by developing a package, which allows the realisation of the above described spectrum of attributes. (Braess et al., 2013, p.1143)

In order to create a good concept, concept development has to be a holistic process, involving all value-adding divisions. Furthermore, it is important to integrate the divisions responsible for the serial development at an early stage, because a good concept lives on compromises. (Braess et al., 2013, p.1143) Therefore Attribute Framework plays an essential role, because it builds an "internal language" for inter-divisional accommodation on vehicle contents (AUDI AG, 2012b, p.6).

As part of the concept development, Attribute Profile is broken down based on Technical Product Description (TPB), into levels of individual components, in order to define a functional specification sheet.

Based on today's derivatisation of vehicle segments the conception of platforms and tool-kits gains more and more importance. The basis of platforms or tool-kits occurs during the definition of the

concept. (Braess et al., 2013, p.1143)

Therefore, it is essential to know the different specifications of attributes of all integrated vehicles at the beginning of developing a tool-kit. Hence, it could be that attributes of a specific vehicle have to be defined 2-3 years before their PS, because if the tool-kit is not able to implement a specific feature, then the vehicle has to set this feature aside. Thus, the conception of a new tool-kit is a huge challenge for the whole company. With the concept decision, which marks the end of concept development, serial development then starts. This is not considered in the course of this thesis.

3.2 Customer Orientation at AUDI AG

For the reason, that the PEP of AUDI AG is not very customer-oriented, the business division Marketing & Sales has thought about how AUDI AG could integrate more customer orientation into the PEP. To achieve this, the processes within the company, especially the PEP, should be justified more strongly according to customer expectations and requirements. The top requirements of a new vehicle should be defined in time and their degree of fulfilment should be monitored in a lasting way. (AUDI AG, 2012c)

Therefore, they have created the idea of Customer Process, which is described in the following section. Using Customer Process, the business division Marketing & Sales would like to highlight and to trigger the requirements from customers and markets into the company, to satisfy the needs of customers optimally and to check their degree of fulfilment.

3.2.1 Customer Process

With Customer Process, the business division Marketing & Sales would like to trigger the interests of the brand, markets and customers into the relevant processes for product development and to reflect them continuously. Using Customer Process, further objectives should also be achieved:

- To provide a platform for the dialogue between Technical Development and Marketing & Sales in order to eliminate problems of understanding, because New Product Development (NPD) is a complex process requiring input from both R&D and marketing. A successful development process of a new product meets market demands and requires an adequate technical solution. (Song and Thieme, 2006, p.308)

- To align the advance development and the product development more with customer needs.

- To prematurely know what requirements the car has to fulfil in order to be able to develop the car without major changes in the further course of the PEP.
- To indicate a prioritisation of issues relevant for the positioning.

Therefore Audi has created, based on the innovation process suggested by the design and innovation consulting firm IDEO, the philosophy of Customer Process, which is illustrated in figure 3.8

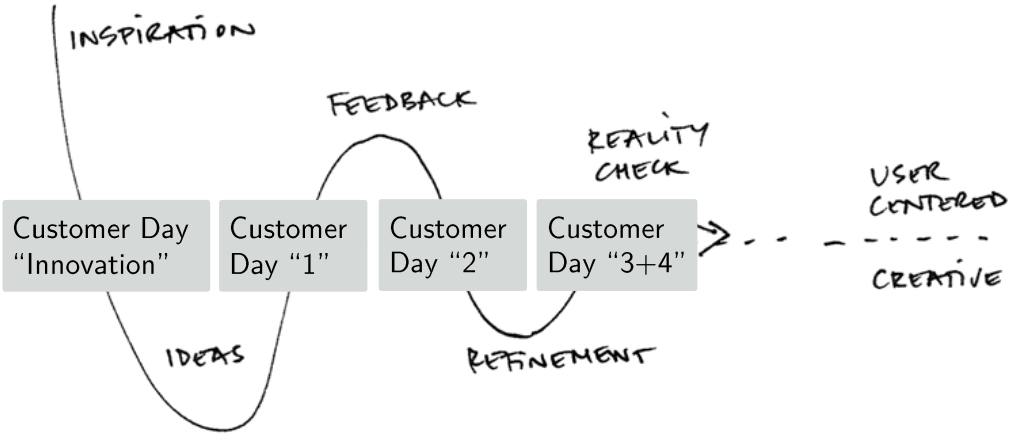

Figure 3.8: Philosophy of Customer Process, cf. (AUDI AG, 2013d)

The process starts with an inspiration on the part of marketing, using strategic tools and several market research studies to identify the prospective needs and requirements of customers, such as NCBS studies, trend analyses, ethnographies, interviews of experts etc. Based on these, the Technical Development then generates ideas to solve these demands. Afterwards, Marketing & Sales check if the technical solutions for the different problems meet customer requirements from a customer's perspective. The next step is the refinement of these solutions to achieve the satisfaction of customers. Finally, a reality check is performed using clinics or other possibilities to directly get feedback from customers.

Based on this philosophy, Customer Process is developed to ensure the integration of customer requirements into the PEP. An overview of the "Customer Process" along the PEP is shown in figure 3.9.

The process can be divided into three main phases according to the PEP described in section 3.1.3. The first phase is about advance development and about innovation management. In the next phase, product planning and concept development take place. Afterwards, the serial development starts and lasts until the SOP. Along this process, five Customer Days with different assignments and objectives are located.

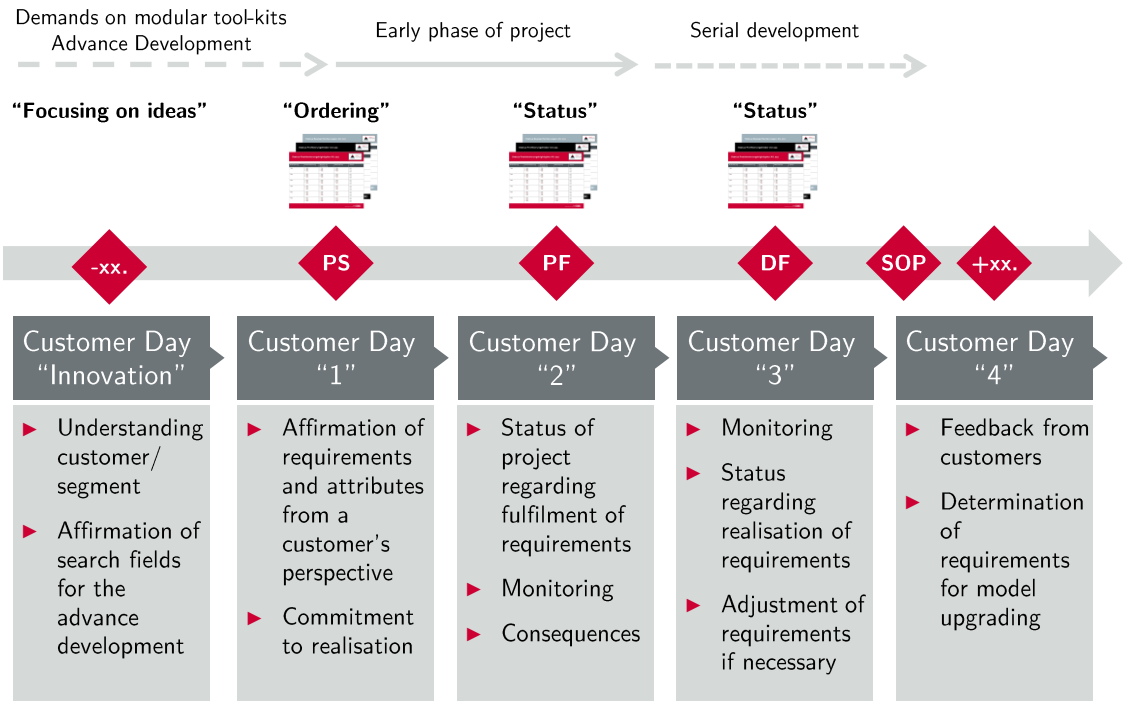

Figure 3.9: Overview of Customer Process, cf. (AUDI AG, 2013d)

Customer Day "Innovation"

The first one is the Customer Day "Innovation", which should take place around about 2 years before PS for the particular vehicle project. This Customer Day has never been done yet, but the idea of Customer Day "Innovation" is, on the one hand, to influence advance development in order to generate the right innovations, at the right time and for the right car. On the other hand, it is to trigger customer requirements early enough into the development of the tool-kit in respect to the platform of the car, whose development mostly starts half a year before the actual PS. The objectives of this Customer Day is to give direction to advance development through the definition of search fields relating to the target vehicle, the definition of search fields for possible "game changers" and the initiation and lasting guidance of a dialogue between the Technical Department and Marketing & Sales, which does not exist at such an early point of time at the moment. At the Customer Day "Innovation", these advance development search fields are presented in order to have them confirmed by the management board. This is also the kick-off for the development of proposals for solution. In this context, under search field, a description of a future relevant need for the target customer is understood based on a customer's point of view and a customer's language. These search fields describe a tangible additional benefit for the customer by means of use cases. (AUDI AG, 2013b)

Wyman (2007, p.7) describe in their study, that the early anticipation of future customer needs is

an essential factor in order to be successful in the future.

Customer Day "1"

The next Customer Day is named Customer Day "1", which is located at milestone PS, with the ambition of integrating customer requirements into product planning.

The customer and his/her expectations of a product are focused on at this Customer Day. It is about establishing an understanding for the living environment of customers and his/her buying motives. At this event, an insight into general social developments in the relevant segments and an overview of international product requirements are provided. (AUDI AG, 2012c)

In addition, an understanding of the role of the vehicle in its segment is established, with its strengths, weaknesses and future customer's expectations.

Furthermore, these international customer requirements are arranged and divided related to the Kano-Analysis (see 2.3.3.2) into positioning highlights, into fields, where the car can be distinguished from competitors and into basal factors (AUDI AG, 2013d).

The objective of this event is the commitment of customer requirements and the kick off of attribute-based product planning by means of the Attribute-Based Development Process, which is described in section 3.2.2. Customer Day "1" has taken place up to 3 times now, namely for the vehicles Audi A8, Audi A1 and Audi A6. The Customer Days "2"-"4" are intended to ensure the reflection of requirements during the PEP and to show volume and price consequences in the case of non-compliance. These Customer Days are considered more closely as follows:

Customer Day "2"

At milestone PF, a project status of customer requirements is submitted in the course of Customer Day "2". This Customer Day has not been arranged yet. Here, a transparent assessment of the accessibility of project requirements from the customer's perspective through the business division Marketing & Sales takes place. Therefore, spheres of activity and solutions are assessed. In connection, the consequences of the project status to the objectives (price/ volume) of Marketing & Sales are shown, if necessary.

Customer Day "3"

The Customer Day "3" is contemplated at milestone DF, but has not been arranged yet. This Customer Day should serve as a monitoring / tracking of customer requirements and should provide an opportunity to adapt the top specifications, if required. At DF the chance is still given to trigger changes into the process at relatively low costs, because afterwards the release for planning and purchasing starts and then it becomes more difficult and expensive to change something.

Customer Day "4"

The last Customer Day, named Customer Day "4" is planned after SOP and has not been arranged yet. Here, one would like to give a review about whether the project objectives have been achieved, with the aid of first feedback from the customers. Based on this feedback, the top requirements for model upgrading should be determined.

3.2.2 Attribute-Based Development Process

In this section, an answer should be framed regarding how customer requirements presented at Customer Day "1" should be continued in the further progress of the PEP. Therefore, a process named *"Attribute-Based Development Process"* has been defined in a cross-functional team, which takes places in the phase of product planning and concept development. In the context of the Attribute-based Development Process the phase from PS until milestone KE is structured in detail. It is mainly about the transition of customer requirements into technical solutions capable of series production.

The Attribute-Based Development Process starts at PS with a first suggestion for the positioning and for the extended competitor environment worked out by Marketing & Sales. In the course of the Customer Day "1" (see section 3.2.1) a vision of the product, based on the strategic tools mentioned above, on the feedback from the markets as well as on the trend scouting etc., is presented to the management board and to the project team. As mentioned in section 3.2.1, here the requirements for the product from a marketing point of view are introduced.

Then, these requests are handed over to the PPT and serve as the kick off for the product planning. Simultaneously, Technical Development starts with the preparation of the first draft of the Attribute Profile (see section 3.1.5), using this information. Here, with the help of the QFD approach (see section 2.3.3.2), customer requirements are assigned to attributes, which are weighted and prioritised based on strategic tools as well as on the benchmark of the predecessor. Afterwards, fields of action are defined according to attributes, which are subsequently prioritised again. Accordingly, measures are derived in order to fulfil these fields of action.

In the next step, a first positioning on the first level of the Attitude Profile is undertaken in the PPT, based on the customer requirements, to gain a coarse positioning in the form of the Attribute Profile on the first level.

After that, further information from the benchmark, the predictions of competitors and feedback from the business divisions are worked on within the context of an Attribute Workshop. In the course of this workshop the attributes of the second level are assessed according to the relevance for the customer. Moreover, the target positioning for each derivative on the second level of the Attribute Framework is arranged and is opposed to the predecessor. The result is a first company-wide, confirmed draft of the Attribute Profile including needs for action, which is necessary for the attainment of each attribute. (Hörmansperger, 2013, p.38)

Later in the process, detailed Attribute Workshops start inside Technical Development to verify the established needs for action in order to identify fields of action. As part of this, customer requirements are transformed into technical target values, using the QFD approach, in order to receive a catalogue of requirements for the engineers. These fields of action are introduced to a team responsible for the concept, named Concept Team. Afterwards, those fields of action are confirmed by members of the different business divisions in the PPT. Subsequently, the team responsible for attributes, named Attribute Team, defines measures for the identified fields of action. Simultaneously, proposals of vehicle concepts are compiled by the specialist departments of Technical Development.

Within the context of defining measures, conflicts of objective might occur, which must be solved inside the Technical Department. If this is not possible, they must be escalated in the PPT, which is responsible for the resolution. As an example of a conflict of objective between the attributes of Attribute Framework, "total fuel range" and "transportation of goods" is supposed to be mentioned. This is caused by the fact that the fuel range depends considerably on the fuel tank volume. The larger the fuel tank volume, the smaller the luggage compartment volume. (Hörmansperger, 2013, p.39)

In the further progress of the project, the fulfilment of attributes is checked based on the concept (virtual concept vehicle). Afterwards, the first draft of Attribute Profile is presented to a new committee called *"Attribute Conference"* in order to confirm it. The objective of this committee is to decide on an obligatory Attribute Profile without conflicts. Optionally, a revision, supplementation and actualisation of the Attribute Profile is performed. Based on this, a recommendation for the Attribute Profile, for the conflicts of objective and for the solution strategy is derived. Concurrently, further measures are defined, vehicle concepts are described and an initial outline of the TPB and the Technical Concept Description (TKB) respectively is created by the specialist departments of the Technical Development. Moreover, a Virtual Concept Vehicle (VKF) 0 is developed to assess the accessibility of the attribute targets. Then, the Attribute Profile, the conflicts of objective, and the solution strategy are presented at the Attribute Conference to the managing board of Marketing & Sales and Technical Development as well as to diverse business unit managers, in order to

receive a balanced Attribute Profile, without conflicts, inclusive of all fields of action and measures already available. The adjusted Attribute Profile, without conflicts, is then confirmed and released again to a top ranking committee. Based on the agreed Attribute Profile all measures are set aside with expenses and the accessible sale volumes are investigated to highlight the consequences of the Attribute Conference and the estimated sales volume in the context of Customer Day "2" (see section 3.2.1). Here an opportunity for adapting the requirements of the vehicle is provided once again. To the milestone PF the transition of the product planning phase into the product development phase involving serial development takes place. In the phase from PF until milestone KE the focus lies on the monitoring and tracking of attributes using VKFs to evaluate the degree of fulfilment of the attribute targets. Simultaneously, the TPB is prepared in order to be assessed by the diverse business divisions.

For confidential reasons, a detailed description of the Attribute-based Development Process according to Hörmansperger (2013) is arranged in the appendix (see Appendix B).

4 Identification of Success Factors and Optimisation Potentials in the Customer Process

Since Customer Process is situated in the initial stage, separate responsibilities and tasks between the individual Customer Days are only partially defined. Thus, the level of awareness of Customer Process within the company is relatively low. The implementation of Customer Process also implicates a change of familiar functions of involved process owners, which might cause conflicts. This leads to the demand for identifying the success factors and optimisation potentials of Customer Process, in order to establish the process within AUDI AG. Using the examples of the Audi A8-, A6- and A3- successor projects, success factors, tasks and process steps, which are needed to firmly anchor the customer requirements in the PEP and to make them effective, are identified. Therefore, a stakeholder analysis is carried out in order to identify all involved departments as well as to highlight the opinions, processes, roles and motivations of each stakeholder. From the findings of the stakeholder analysis, fields of action are derived.

4.1 Methodology for Identification

Actually, Audi is learning to deal with this process, which causes a change of the familiar functions of the involved process owners. In conformity with Kleingarn (1997, p.46) changes within organisations often fail due to the internal resistance of participants. These resistances comment on the effect that different members of the company attempt either to maintain the status quo, or to influence the arrangement of change. As a result of this behaviour the whole enterprise does not benefit, but the utility is maximised.

Therefore, the involved individuals and organisational units, named stakeholders, who are relevant for change must be identified, with the goal of developing a strategic eye on them as well as on the relationships among themselves (Deutinger, 2013, p.63).

The actual word stakeholder has its origin in the management literature of an internal memorandum at the Standford Research Institute, in the year 1963. The notation stakeholder was consciously

chosen by representatives of the stakeholder theory to point out that there is, in addition to the shareholder, another interest-group which is important for any company. (Freeman, 2010, p.31)

Freeman (2010, p.53) defines stakeholders as

> *"...any group or individual who can affect or is affected by the achievement of an organisation's purpose".*

Mitchell et al. (1997, p.58) list many other definition of stakeholders by various authors, beside this by Freeman.

In the context of this thesis, the definition of Freeman is narrowed down from an organisational perspective to a company's internal project perspective. With the term stakeholder, the organisational units of AUDI AG, which have a "stake" or an interest in Customer Process are meant in the further course of this thesis.

To identify which departments are involved in the Customer Process, a stakeholder analysis should be performed in order to assess their interests, objectives, motivations as well as power according to the Customer Process. Moreover, their feedback should be integrated with the stakeholders into the change process, because in the best case, the stakeholder could support the achievement of defined targets/results, otherwise they could inhibit the success of the project (T. Becker, 2005, p.251).

Freeman suggests a framework of three levels to understand the process which an organisation uses to manage the relationships with its stakeholders. These three levels are the rational, the process and the transactional level. (Elias et al., 2002, p.303)

Primarily, at the rational level, it is important to understand who the stakeholders are and what their perceived stakes are. Therefore a stakeholder map should be prepared and furthermore, the stakes should be identified and analysed. Freeman suggests the use of a 2 dimensional grid to depict the organisation's stakeholders. The first dimension categorises the stakeholders by interest or stake and the second dimension of the grid can be understand in terms of power. (Elias et al., 2002, p.303-304)

Secondly, at the process level, it is necessary to understand how organisations manage their relationships with the stakeholders (Elias et al., 2002, p.303-304).

Finally, the transactional level is about interacting with stakeholders and deducing necessary measures (Freeman, 2010, p.69-74). In addition, the dynamics of stakeholders is an important aspect of the stakeholder concept, because over time, stakeholders could change. New stakeholders may join in and others may drop out due to being no longer involved in the process.

Mitchell et al. (1997, p.854) propose that the identification of classes of stakeholders can be offered by the possession of the following three attributes:

> *"(1) the stakeholder's **power** to influence the firm, (2) the **legitimacy** of the stakeholder's relationship with the firm, and (3) the **urgency** of the stakeholder's claim on the firm."*

4.1.1 Approach of the Stakeholder Analysis

The approach of the stakeholder analysis of Customer Process is based on the literature discussed before. Mostly, the literature focuses on an organisation, while discussing the stakeholder analysis. In this section, methodology is illustrated which is adapted from literature for the evaluation of Customer Process. As part of a stakeholder analysis, relevant organisational units for Customer Process are derived and expressed in an overview. Then these could easily be characterised under specific points of view, like their motivations, objectives, power as well as influence on Customer Process.

Figure 4.1 shows the four steps of systematic stakeholder analysis relevant for the evaluation of Customer Process.

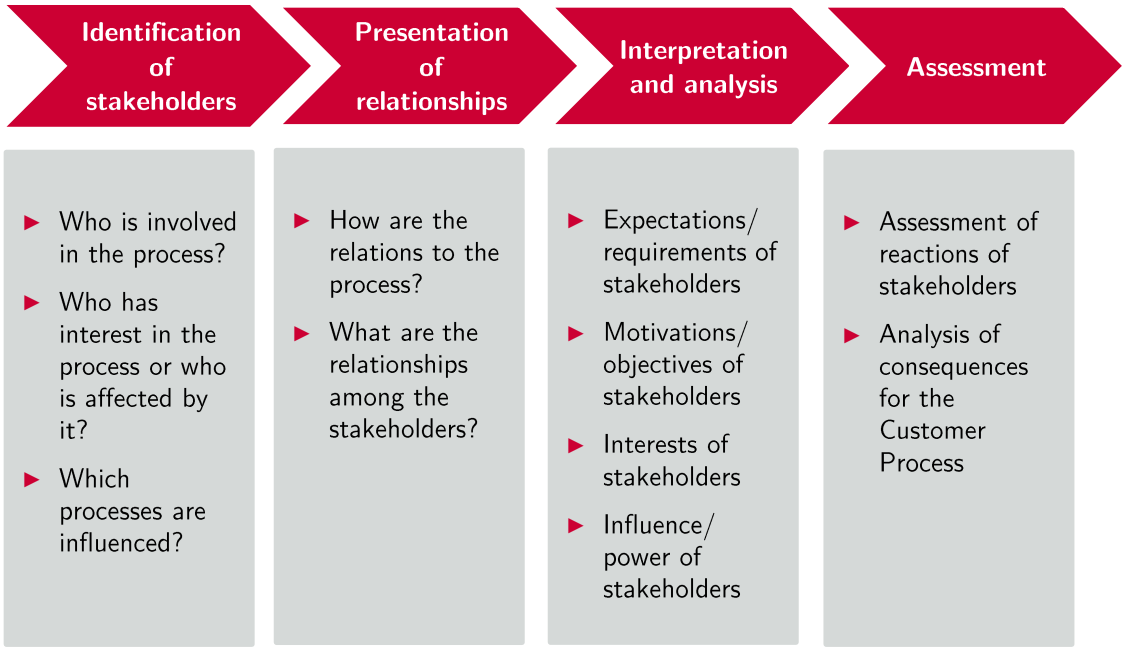

Figure 4.1: Methodology of the Stakeholder Analysis, author's own work

The first step is to identify the stakeholders. That means evaluating who is involved in Customer

Process respective of who is affected thereby. Moreover, it is important to observe which other processes are influenced as well as which committees of AUDI AG have influence on it.

In the second step of the methodology, relationships between the stakeholders are described in order to be aware of conflicts of interest and problem areas between them. Furthermore, relations to other processes are analysed.

In the third step, the stakeholders are characterised according to the following points:

- Expectations / requirements of stakeholders
- Motivations / objectives of stakeholders
- Interests of stakeholders
- Influence / power of stakeholders

The last step is about an assessment of the reactions of stakeholders as well as an analysis of the consequences for Customer Process thereof.

4.1.2 Procedure of Gathering Information

The aim of this section is to demonstrate the procedure of gathering information, which is relevant for stakeholder analysis. For an empirical evaluation, it is important to distinguish between quantitative and qualitative methods (Gläser and Laudel, 2010, p.24). Basically, if a situation can be described using numbers, it is called a quantitative method. In contrast, if a situation is described using a verbal description, it is called a qualitative method. (Häder, 2010, p.23)

The decision for one of the two methods has consequences for the choice of appropriate methods (Gläser and Laudel, 2010, p.28).

To gather information for analysing stakeholders as well as their processes, two options exist. The first option is to hold a workshop, the other is to concentrate on interviews with the affected persons. (Best and Weth, 2009, p.70) Both possibilities implicate advantages and disadvantages, which are faced in figure 4.2.

The described specifications in figure 4.2 as well as the time difficulty to team all stakeholders, leads to a decision to arrange the gathering of information with the aid of expert interviews.

In turn, various possibilities exist for the transaction of interviews. In general, interviews can be distinguished according to their degree of standardisation into (Gläser and Laudel, 2010, p.41):

- **standardised interviews:** a predefined sequence of closed questions and possible answers for each interview

	Advantages	Disadvantages
Workshop	▶ Faster results because of no statistical analysis ▶ Participants act together, therefore faster consensus can be achieved ▶ Overall context of the process is transparent for all ▶ Weaknesses are already visible for all	▶ Mutual influences are possible ▶ Important experiences of individuals could be omitted ▶ Tendency to conceal problems ▶ Tendency to unfair practices due to limited time
Interview	▶ Experience of each interviewee are recorded in detail ▶ Detailed process description is possible ▶ Different perceptions at the process and resulting problems are registered	▶ Revival of voting is necessary for achieving consensus ▶ Analysis tends to be more extensive ▶ Interviewees do not know their contribution to the overall process ▶ Incorrect information are possible due to interviewer's interpretation

Figure 4.2: Advantages and Disadvantages of Interviews and Workshops, cf. (Best and Weth, 2009, p.72)

- **semi-standardised interviews:** in contrast to standardised interviews, the interviewee can choose how they would like to answer the question
- **non-standardised interviews:** no predefined questions and answers

Standardised interviews are counted as a quantitative method, while non-standardised interviews are conducted in qualitative research (Gläser and Laudel, 2010, p.41).

Expert Interviews

Expert interviews, whose task it is to tap knowledge from the interviewees, are assigned to non standardised interviews. For this purpose, a guided interview with open questions is suitable. This belongs to the group of non-standardised interviews. A questionnaire forms the basis of a guided interview and contains all asked questions. However, neither formulation nor sequence of questions is mandatory, which permits enquiry. The aim is to illustrate the form of a natural conversation. (Gläser and Laudel, 2010, p.42-43)

Approach of the Interview

The procedure for the expert interviews is based on the empirical socio-scientific research process (see figure 4.3).

Every empirical research is based on a question to close the knowledge gap. Thus, first of all an experimental field is defined. Afterwards, central questions are developed in order to specify information, which have to be surveyed. This is necessary in order to answer the research question. (Gläser and Laudel, 2010, p.62-91)

During the preparation of empirical studies, numerous strategic decisions must be made in order to gradually make the transaction concrete. In this connection, it is about the classification of the experimental field. That means, at which level it should be observed, which special cases should be considered and how many interviews should be conducted etc. (Gläser and Laudel, 2010, p.93-100)

Afterwards, expert interviews are conducted based on an interview guideline.

The next step is the analysis of results. For this, a report of the interview respective of a transcription should be undertaken to be able to analyse the interviews (Gläser and Laudel, 2010, p.192-193). The analysis of the results is oriented on the model of qualitative content analysis by Mayring (Mayring, 2010, p.60).

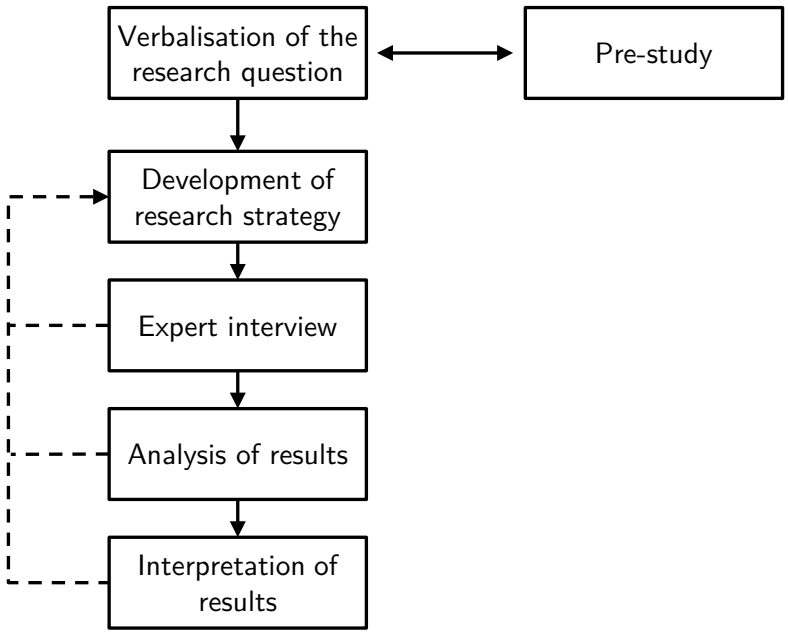

Figure 4.3: Structure of the Empirical Procedure for Expert Interviews, cf. (Gläser and Laudel, 2010, p.35)

The last phase deals with the interpretation of results. According to Gläser and Laudel (2010, p.261) it is the most creative, various and difficult part of the research. Here, it is about answering the research question, using knowledge and experience to reach a promising result.

At the request of the interviewees and for confidential reasons the transcription of interviews and its detailed analysis are not published in this master's thesis.

Interview Guideline

The interview guideline is a framework of questions, which are asked in the course of an interview. It should not start with the first question. It is recommended to brief the interviewee in the beginning about the objective of the research and the interview. Furthermore he/she must be clarified about privacy and confidentiality. If it is requested to make audio records (which is strongly recommended), the permission of the interviewee must be obtained. The number of questions complies with the content, with the openness of questions as well as the complexity of the topic. Generally, 8 to 15 questions can be dealt with in one hour. The questions ought to be simple and understandable. To allow an approximation of a natural course of conversation, the coherent content issues should be treated sequentially. The first question should be easy to answer in order to break the ice at the beginning. Also the last question should be convenient, to leave a positive mark. For this a question about further important aspects of the topic from the

interviewee's point of view is applicable. (Gläser and Laudel, 2010, p.142-149)

Ullrich (1999, p.436-437) suggests controlling the interview guideline, after finishing it, according to the following issues:

- Why is it necessary to ask this question? (theoretical relevance or technical function of the question)
- What is asked? (Content related dimension and possible answers are checked)
- Why is the question verbalised this way? (type of questions)
- Why is the question at the concrete position? (structure of the interview guideline)

Finally, it is recommended that the interview guideline be adjusted to the particular interviewee and the situation of the interview (Gläser and Laudel, 2010, p.150).

The interview guideline for the expert interviews at AUDI AG, in order to be able to conduct the stakeholder analysis, is developed according to these principles and is arranged in the appendix (see Appendix A).

4.2 Realisation and Evaluation of the Stakeholder Analysis

In this section the realisation of the stakeholder analysis is considered in detail. This happens according to the 4 steps of the stakeholder analysis's approach (see section 4.1.1). The first step is the identification of the business divisions and departments, which influence the implementation of Customer Process. Afterwards, the relationships between the identified stakeholders is analysed because good contact and trust among the involved departments are one success factor for good cooperation and a smooth process flow (Goh, 2002, p.25). In the third step, a detailed analysis of the stakeholders takes place. According to Freeman (2010, p.62), the stakeholders are classified in a two-dimensional grid, in order to visualise who the most important ones are. At the last step of the approach, fields of action for improving Customer Process are derived from the stakeholders' point of view.

4.2.1 Identification of the Stakeholders

According to the concept of Freeman (2010), which seems to be most suited for Customer Process, a systematic stakeholder analysis starts with the preparation of a stakeholder map. In contrast to the classic stakeholder analysis, which usually deals with the internal and external stakeholders of a company, like owners, competitors, employees, governments, suppliers etc., the focus of this thesis is on the internal stakeholders of AUDI AG. With the term internal stakeholders, different

business divisions with diverse departments are meant.

Generally, AUDI AG consists of seven business divisions, including plenty of different departments.

- Chairman of the Board of Management (G)
- Technical Development (E)
- Marketing & Sales (V)
- Finance & Organisation (F)
- Production (P)
- Purchasing (B)
- Human Resources (S)

In order to identify stakeholders out of the multitude of departments, attention is paid in detail to the business divisions which are the most important ones for the successful implementation of Customer Process. These include the business divisions Chairman of the Board of Management, Technical Development, Marketing & Sales and Finance & Organisation .

The business division Production has an indirect influence on Customer Process, because they are responsible for the production of the customer requirements that are developed by Technical Development. The business divisions Purchasing and Human Resources have no influence on Customer Process. Therefore, these business divisions are not dealt with in this thesis.

In the next step, the business divisions involved are accurately analysed in order to identify the key departments in PEP and therefore in Customer Process.

As AUDI AG is lined up according to model lines, 3 vehicle projects are chosen for analysis in order to gain an overview of PEP and of Customer Process with its diverse phases. Each chosen model is located at a different period of the process.

The first model, the Audi A8, is chosen since it has gone through nearly all the early activities of PEP and is actually situated shortly before Customer Day "2". It is the first project using Customer Process, therefore the people involved can be asked about their experiences, opinions and about where there might be room for improvement.

As a second model, the Audi A6 is chosen since it actually has the Customer Day "1", which is the origin of the product planning phase. Here, the focus is on the crossover of the identified requirements from Customer Day "1" to the planning process and especially how these customer requirements could be triggered into this process and the following approach.

The third model, the Audi A3, is located in the so-called "very early" phase or "front-end" of product development. This vehicle is the pioneer for developing a new innovation and advance development process respectively. It is the first project, where a Customer Day "Innovation" will

be conducted.

Figure 4.4 provides an overview of the three vehicles chosen for the evaluation of Customer Process and their progress in the PEP.

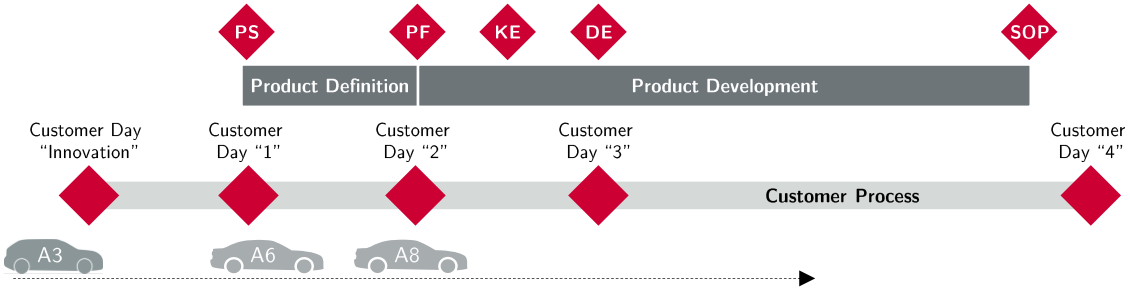

Figure 4.4: Chosen Projects for the Evaluation of Customer Process, author's own work

According to these vehicle models and their progress in PEP, the stakeholders are identified together with the advisers of Audi.

Figure 4.5 illustrates the stakeholders of Customer Process and its position in the hierarchical structure of AUDI AG.

In the following consideration, the stakeholders who take part in Customer Process are described according to their area of responsibility.

- Business Division: **Chairman of the Board of Management**

  - *Product Planning (I/GM-5):*
    The department belongs to the *"Modellreihe"* (see figure 3.1) and is responsible for product planning in the early phase of PEP. That means from milestone PS until the milestone PF. Afterwards, they leave PEP and hand over the project to the project management of the specific model line. They lead PPT as mentioned in section 3.1.2 consisting of representatives of all business divisions and are responsible for preparing the presentation of the documents for decision-making bodies.

  - *Project Management (I/GM-.):*
    Project management of the particular model line officially adopts the project from I/GM-5 at the milestone PF and goes along with it until SOP. In the early phase they are consultative on the product manager's side. They are also belonging to the *"Modellreihen"* and are leading the Steering Team. They are responsible for the target-oriented development of the vehicle from a project management's point of view.

- Business Division: **Technical Development**

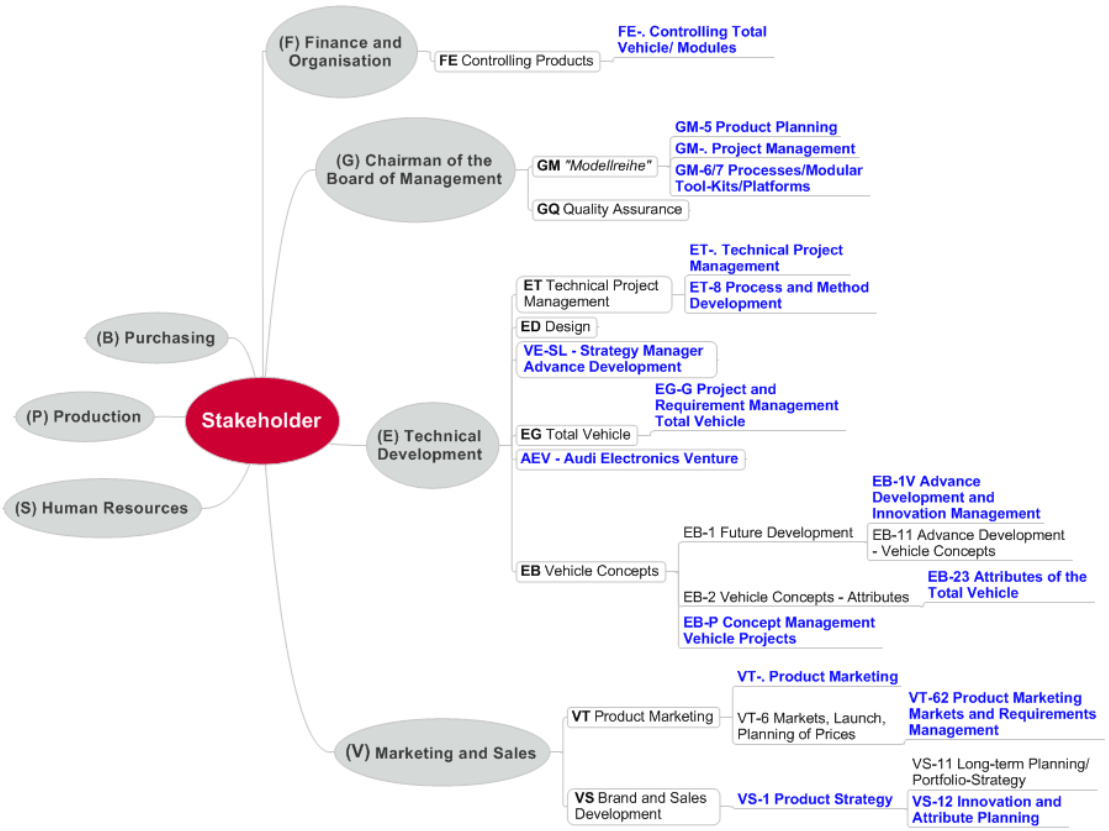

Figure 4.5: A Stakeholder Map of the Customer Process, author's own work

– *Concept Management Vehicle Projects (I/EB-P):*
  I/EB-P is responsible for the concept development of the car and is concerned with all development activities, usually from a little before PS until the milestone KE. I/EB-P forms the supervision of concept development and accounts for the development of package, attributes, ergonomics and all relevant things for the total vehicle. At milestone KE it hands the project over to Technical Project Management, which is consultative regarding finances on its side from the beginning.

– *Attributes of the Total Vehicle (I/EB-23):*
  I/EB-23 starts at PS with Attribute Planning on the part of Technical Development and gives thought to the positioning of the vehicle in cooperation with PPT. This department is responsible for the preparation of the Attribute Profile, where the transition from positioning into technical contents takes place. Furthermore, they are in charge of formulating fields of action and of defining measures for implementation into the project. It supports the concept manager from I/EB-P and monitors the status of the project regarding attributes, until milestone KE where it leaves the process.

– *Advance Development and Innovation Management (I/EB-1V):*
  I/EB-1V is responsible for the arrangement and management of the innovation process relating to vehicle projects from idea to series. I/EB-1V manages and organises the early phase of the development process of advance development. Furthermore, the department prepares methods and approaches for target-oriented brainstorming. In addition, it undertakes internal and external communication about advance development and innovation topics as well as managing the prioritisation of advance development projects. That means that I/EB-1V monitors the budget for prioritisation.

– *Advance Development - Strategy Manager (VE-SL):*
  Technical Development is positioned, concerning strategic long-term interpretation, by objectives and advance development is oriented towards these goals. The interviewee is responsible for the objective *"Distinctive Product Experience"* and has to manage the advance development projects according to these objectives. He/she accounts for the advance development budget and can award it to diverse projects.

– *Technical Project Management (I/ET-.):*
  I/ET-. is responsible for the project management of a particular model from a technical point of view. In the phase from PS until milestone PF they support the concept manager from I/EB-P in the PPT and continue the process alone until SOP. Their task is to distribute errands inside the Technical Development stage and to account the vehicle's respective costs, deadlines, technical solutions and attributes.

– *Process and Method Development (I/ET-8):*
  I/ET-8 accounts for the development of processes and methods inside Technical Devel-

opment and advises the project manager in these issues. The focus of this department is on the harmonisation of processes and tools needed for successful product development. I/ET-8 has no product stewardship.

- *Project and Requirement Management Total Vehicle (I/EG-G):*
  In general, I/EG-G focuses on activities related to attributes in terms of the requirements definition, the prioritisation of attributes, the monitoring of implementation and the overall release of the vehicle for production. The organisational unit is divided into technical market analysis, media analysis / benchmark and into requirements management / prioritisation of attributes. Apart from these departments, there is an administrative department, that accounts and organises the homologation runs. I/EG-G goes along with the vehicle from PS until SOP. They do not have a responsibility for products and construction elements as I/ET-., but they are responsible for cross-functional attributes such as acoustics or CO_2.

- *Audi Electronics Venture (AEV):*
  The Audi Electronics Venture GmbH is a fully owned Audi subsidiary and is the centre of excellence for software development. Their objective is to implement innovations in the vehicle based on new technologies on behalf of AUDI AG. AEV does this through its own functional and software development by means of technology scouting and through participating interests and partnerships. Therefore, they create and secure access to key technologies for Audi products.

- Business Division: **Marketing & Sales**

  - *Product Strategy (I/VS-1):*
    I/VS-1 is responsible for product planning from Marketing & Sales respective of customer point of view. The product planner generates customer requirements and triggers them into PPT. Furthermore, they conduct a planning of volume and price for the particular model. I/VS-1 drops out of the process at milestone PF and hands over the project to the particular Product Marketing (I/VT-.).

  - *Innovation and Attribute Planning (I/VS-12):*
    I/VS-12 is a sub branch of I/VS-1 and supports the product planner in the advance development phase. In relation to this, it is about cooperation with advance development in order to inject customer needs into the innovation process at an early stage. They keep themselves busy with future questions and trends in order to create attractive products. Therefore, they are the initiator of the Customer Process stage and are responsible for the preparation of Customer Day "Innovation" and Customer Day "1" together with the product planner from I/VS-1.

  - *Product Marketing (I/VT-.):*

I/VT-. enters the PEP at milestone PF and adopts the particular vehicle project from I/VS-1. They operationalise the strategic decisions from I/VS-1 and are responsible for the launch. I/VT-. oversees the vehicle after SOP and defines measures for the life cycle.

  - *Product Marketing Markets and Requirement Management (I/VT-62):*
    I/VT-62 operates across all model lines and is responsible for market-side requirement management and for market support. That means, they are in contact with the sales regions and ask them about their requirements and opinions according to the situated vehicle that is just in development. Afterwards, I/VT-62 triggers these knowledge into the process. Together with the particular Product Marketing I/VT-., they are responsible for the Customer Days "3" and "4".

- Business Division: **Finance & Organisation**

  - *Controlling Total Vehicle / Modules (I/FE-.):*
    I/FE-. goes along with the particular vehicle project from PS until End of Production (EOP) from a finance point of view. They are responsible for the costs of the project and the monitoring and benchmarking of these costs in comparison with the targets of other projects in order to guarantee cost effectiveness over model life.

In the context of this thesis, interviews have been conducted with one representative of every registered department above-named.

4.2.2 Description of the Relationships between the Stakeholders

As illustrated in figure 4.1 the next step of stakeholder analysis is about the statements of relationships. In relation to this, the potential flaws of co-operations between stakeholders should be identified by means of a detailed analysis of the expert interviews with the stakeholders. This is essential, because if the cooperation between departments acts up, then the advantages of the division of work and specialisation get lost, which results in a longer duration of processes, lower flexibility and decreasing quality (Pleschak and Sabisch, 1996, p.282).

Figure 4.6 shows the relationships between the stakeholders with identified need for action, resulting from the analysis.

The focus of the analysis is on the 3 most important business divisions for the early phase of PEP. These business divisions are divided into their organisational units (dark grey buttons) and into their single departments (light grey button). Furthermore, a prioritisation of the particular

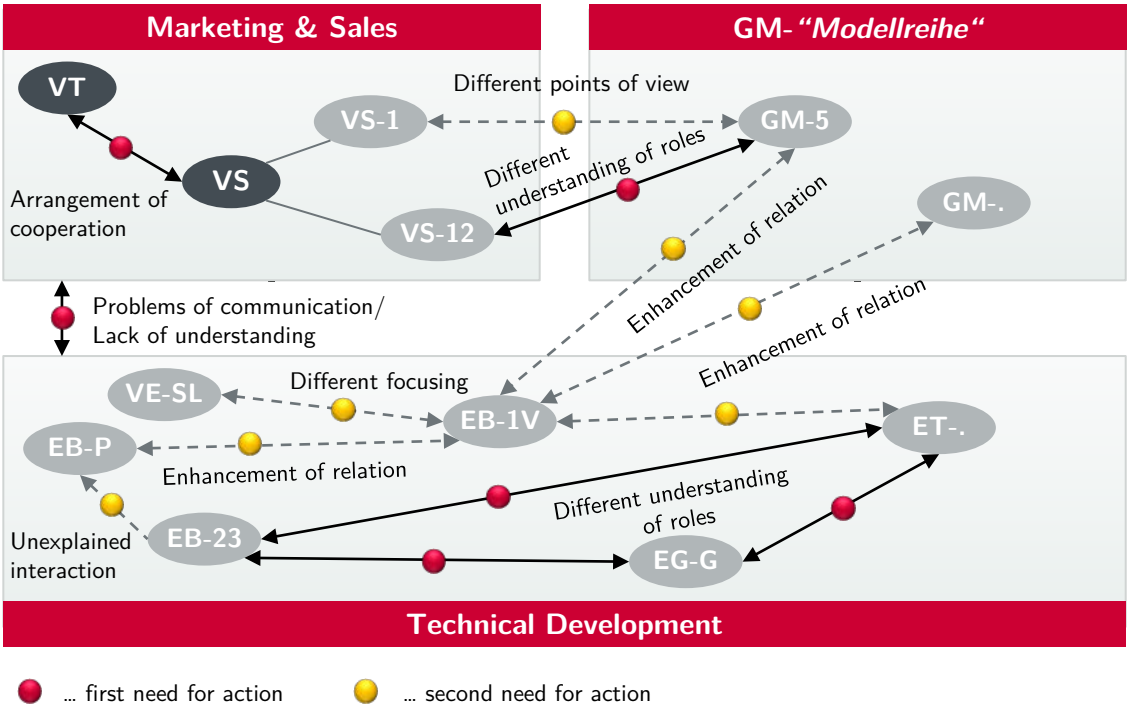

Figure 4.6: Resulting Relationships between Stakeholders with Identified Needs for Action, author's own work

relationships is conducted. The relations with the red buttons and the black arrows have a higher need of action than the other ones.

Essentially, a detailed treatment of the most important relationships is needed.

The first relationship described in detail is between the business divisions Marketing & Sales and Technical Development. Here, a communication problem exists. More precisely, it is about language barriers and mutual problems of understanding, which lead to discrepancy in PEP. This is confirmed by nearly every stakeholder.

The next relation with a high need for action is the relationship between the organisational units *Brand and Sales Development (I/VS)* and *Product Marketing (I/VT)*. At present, there exists no process which regulates this cooperation. There is a breaking point in PEP at milestone PF, where I/VS hands over the project to I/VT. This breaking point is regarded as critical, because now another organisational unit continues the project in part and without some of the knowledge generated before. That is the reason why I/VT would like to enter PEP at PS in order to notice what is discussed in the early phase and why specific decisions are made. All other business divisions do not have this breaking point at PF any more. The request of I/VT to enter PEP at an earlier stage is seen by I/VS critically because of having another focus. I/VS is the strategic part and pays more attention to the fact that all vehicles within the portfolio follow a specific logic in order to achieve an accurate positioning. In contrast, I/VT is the operational part and is more eligible for developing the best vehicle.

Another problematic relationship exists between I/VS-12 and I/GM-5, because I/GM-5 is of the opinion that I/VS-12 tries to purpose the positioning of the new vehicle with Customer Days "Innovation" and "1". In contrast, I/GM-5 thinks that the positioning should be worked out together in PPT in the phase of product planning.

In addition, I/VS-12 views I/GM-5 in the role of leading and forcing the Product Planning Process and is of the mind that I/GM-5 should use its process leadership more effectively to implement the identified customer requirements.

In relations between I/EB-23, I/ET-. and I/EG-G, it is a matter of responsibility relating to the Attribute-Based Development Process. At present, I/EB-23 is responsible for the collection of desired attributes and the preparation of the Attribute Profile. As already noted I/EB-23 is leaving the PEP at milestone KE and I/ET-. should continue this Attribute Process. But at the moment, I/EB-23 and I/EG-G are seeing anyone who is continuing the monitoring of attributes.

Here, I/EG-G sees an opportunity and would like to account for the whole Attribute Process with the argument that they enunciate the technical release for production of the total vehicle, in the sense of fulfilment of customer expectations relating to attributes and quality, shortly before SOP.

In order to deal with such problems between departments, some proposals of conflict resolution are described in section 2.1.3.

4.2.3 Analysis of the Stakeholders

The third step of the stakeholder analysis's approach (see figure 4.1) deals with a detailed analysis and interpretation of the stakeholders according to their:

- Stakes / expectations,
- Power / influence,
- Motivation / objectives and
- Interests

On the grounds of prevention of internal conflicts and confidentiality this part of the analysis is not published. In order to still make an assessment of stakeholders other parameters for the evaluation are chosen, deviating from the classical stakeholder analysis.

In further context, the stakeholders are classified in contrast to the classical stakeholder grid suggested by Freeman (2010, p.62), according to their influence / power and to their benefit of Customer Process for their tasks, which is shown in figure 4.7.

These two dimensions are divided again in order to achieve an accurate classification. The first dimension is about the influence / power of the stakeholders in Customer Process, therefore it is important to try to distinguish between a so-called *"formal power"* and a *"power of presentation"*. With the term "formal power" it is meant that these stakeholders have a kind of means of exerting pressure, for example, I/VS-1 and I/VT-. determine price and volume, I/EG-G has the technical release for production of the total vehicle at the end of the PEP and I/EB-1V as well as VE-SL can concede money.

On the contrary, the term "power of presentation" means that these stakeholders do not have a means of exerting pressure. They only have power in the way they present data. For example *"Modellreihe"* (I/GM), which is responsible for the preparation of the presentation of documents for the decision-making bodies, have power / influence in the way they formulate these.

The second dimension of the stakeholder grid is distinguished between low and high benefit of Customer Process for the stakeholders' tasks.

However, as figure 4.8 presents, differences in the perceived benefit of Customer Process for the stakeholders can be discovered from the interviews. That means that some stakeholders have not realised the benefit of Customer Process for themselves to 100 percent yet. Here, it is effective to

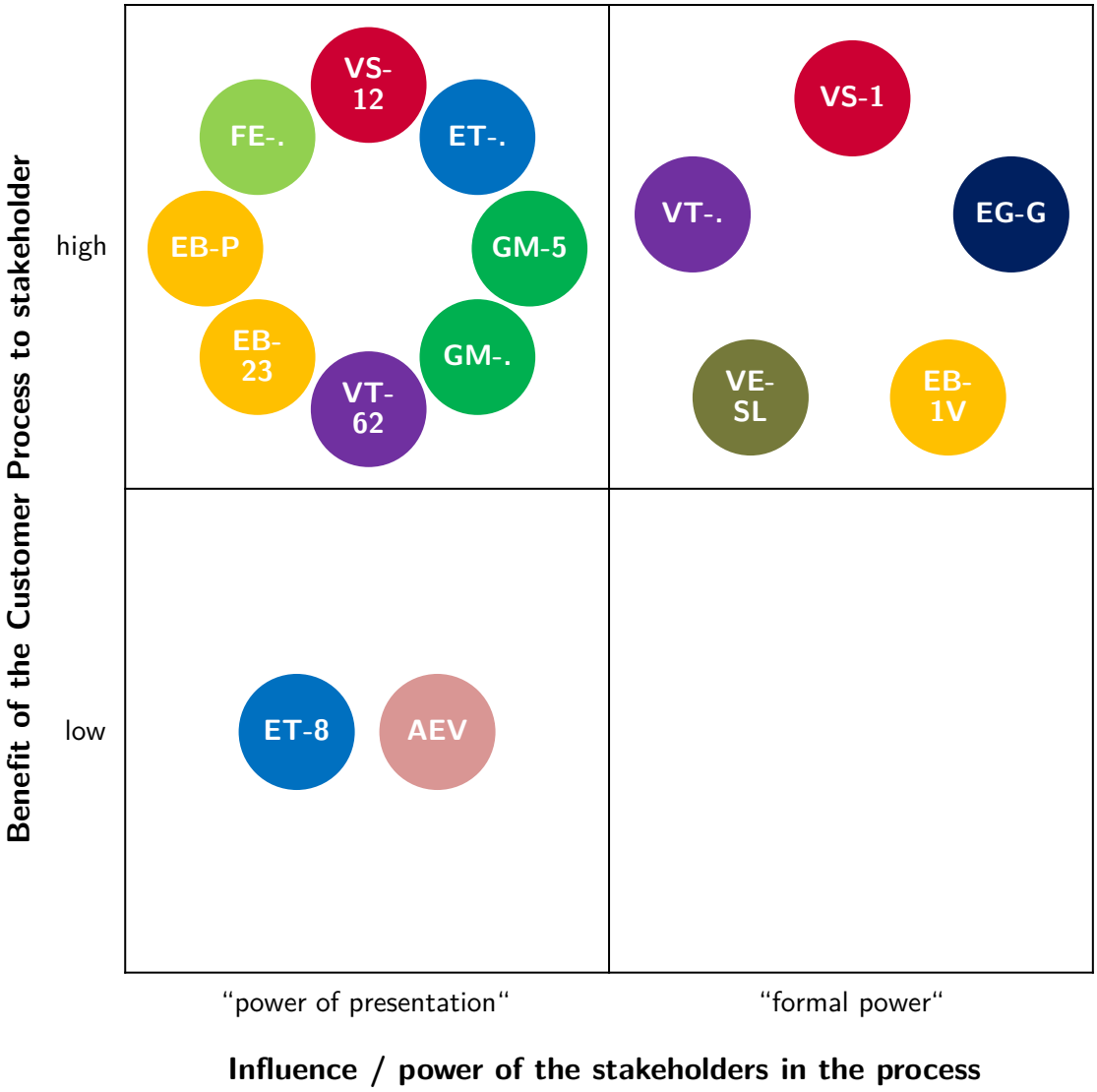

Figure 4.7: Classification of Stakeholders According to Their Influence and Benefit of Customer Process, author's own work

give the affected stakeholders an understanding of the benefits of Customer Process for their daily business.

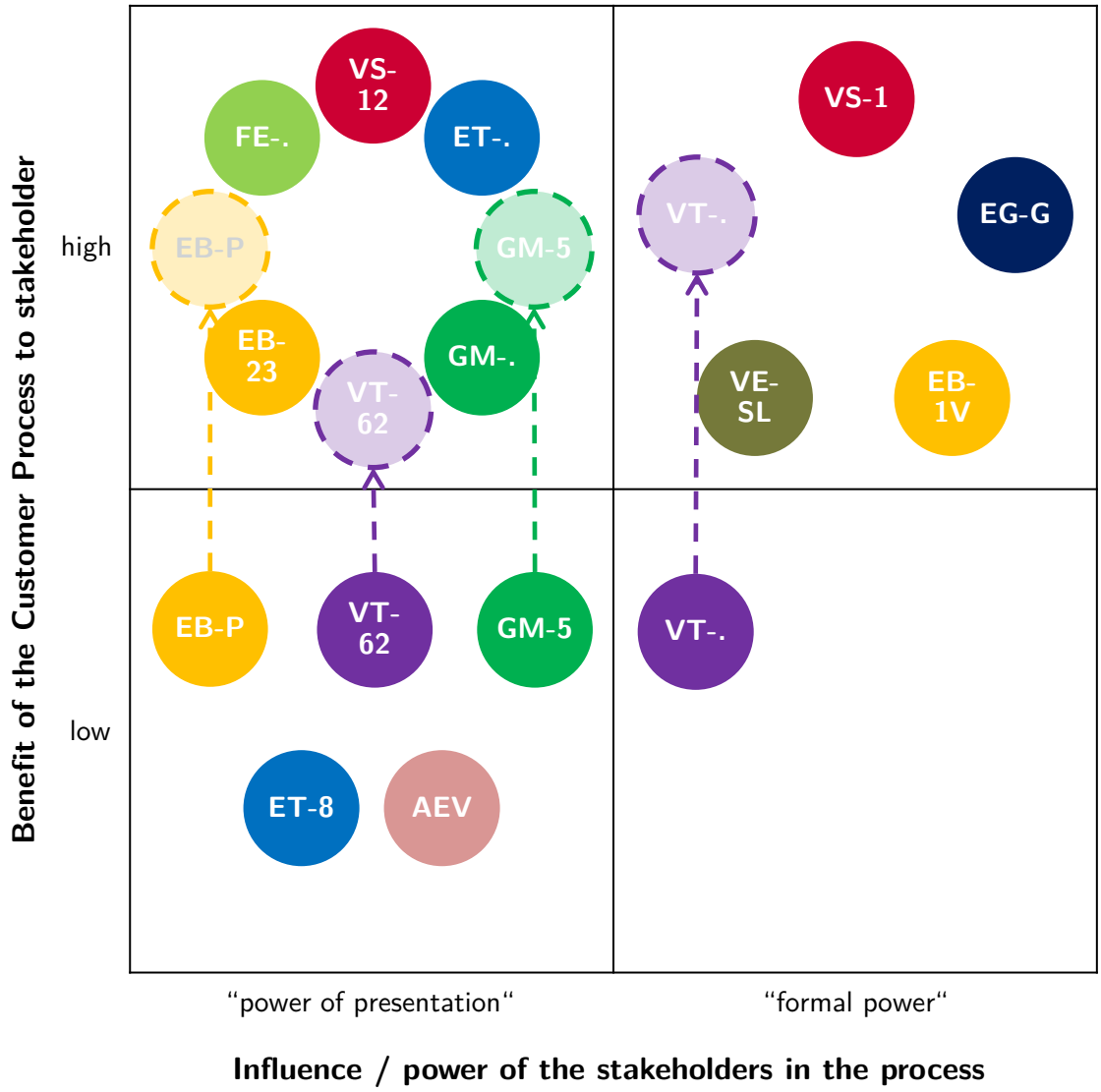

Figure 4.8: Differences in the Perceived Benefit of Customer Process for the Stakeholders, author's own work

One of the most striking results to emerge from figure 4.8 is that I/GM-5, officially the leader of the whole Product Planning Process does not have a "formal power" which of course complicates the management of this process. Therefore, it is essential to bring this department into a position to enable them to force and manage the process. That should happen on the one hand through personal meetings with I/VS-12, where the benefits of Customer Process are clarified together and on the other hand I/GM-5 and I/GM-. should gain some kind of "formal power", for example, in terms of conceding money, instead of only monitoring the budget.

In principle, the department I/EB-P realises the benefit of Customer Process for their tasks, but it is of the mind that Customer Process is not in place in the company yet. Therefore, it is useless for argumentations.

The fact that the realised benefit for I/VT-. and I/VT-62 is not at 100 percent is caused by having not dealt with Customer Process yet, because the most advanced vehicle project, the Audi A8, is currently achieving the Customer Day "2". I/VT-. and I/VT-62 officially enter the process at a later date at milestone PF, but then they are responsible for the residual Customer Days, as mentioned before. Therefore, a further need for information on the part of I/VS-12 is present.

4.2.4 Fields of Action from Stakeholders' Point of View

In the course of the analysis of the interviews, based on the qualitative content analysis from Mayring (2010), the resulting findings are grouped in order to get a general idea of the identified fields of action (see figure 4.9).

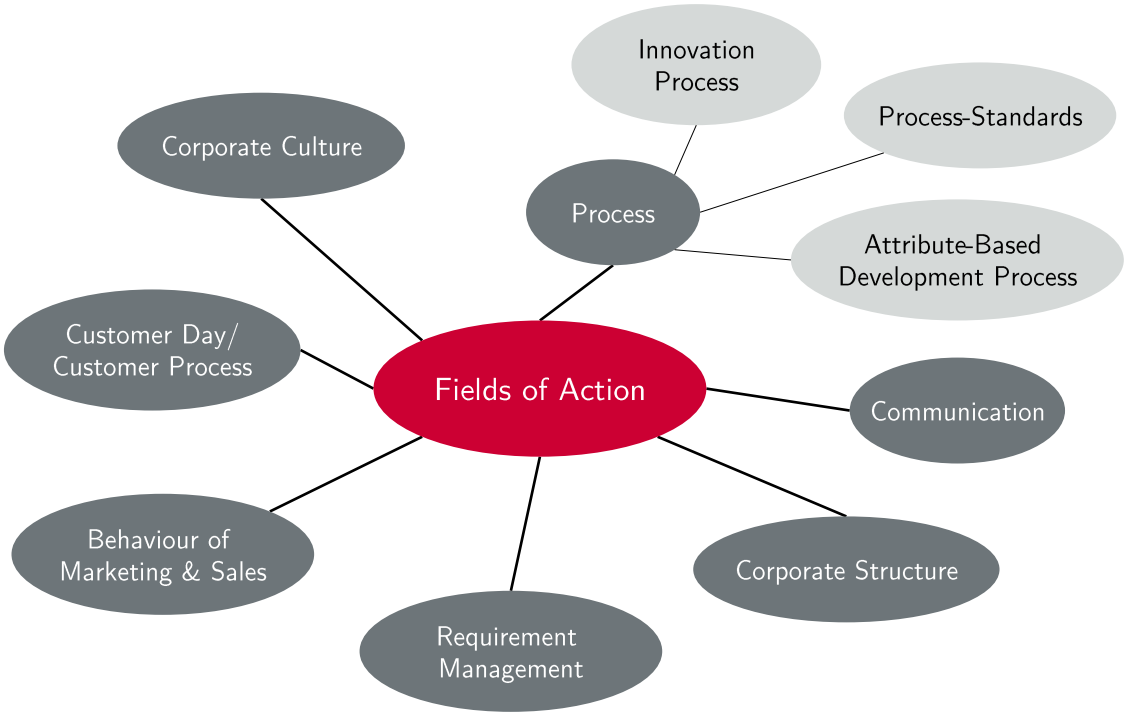

Figure 4.9: Grouping of Resulting Fields of Action from Stakeholders' Perspective, author's own work

Behind each of these fields of action is a list where a multitude of further, more detailed fields of action are arranged.

In the following consideration, a brief overview of each field of action is given.

The first field of action is about **process-specific topics** and can be divided into the three sub areas of Process Standards, Innovation / Advance Development Process and Attribute-Based Development Process. Relating to Process Standards, the stakeholders mention in the interviews that the responsibilities within the Product Planning Process are not clearly defined and that this is essential to establish a higher liability on the one hand, in terms of winning all participants over and to pledge them to contribute. On the other hand, it would be desirable to receive a higher liability concerning information and decisions. Another problem brought up by most of the stakeholders is that there exists a lack of rigour in the process, which means that the tools and methods used are not compatible. A further point is the absence of an adequate monitoring system, where the status of customer requirements and their implementation is monitored from the beginning until SOP in order to create transparency. Relating to the sub area Innovation / Advance Development Process, many stakeholders claim that there are no clearly defined criteria in respect of a process in order to get innovations into the vehicle. Here, it would be necessary to adjust the Advance Development Process with the Customer Process. Furthermore, there is a lack of prioritisation according to which innovations fit best for the vehicle and are feasible. Some stakeholders mention that Audi is too focused on serial development and that it would be essential to direct company attention more to the early phase. Another upcoming point is, that it is important for further success that the advance development succeeds in developing complete systems instead of separate technical issues. The point is to link these particular technical solutions to develop a complete system in order to create an experience for the customer. The last sub area is about the Attribute-Based Development Process. As already noted, here it would be crucial to determine responsibilities and to define an adequate successor for I/EB-23 as of milestone KE.

The next field of action deals with the topic **Communication**. The majority of stakeholders report that one big challenge is the different languages from Technical Development and Marketing & Sales based on their diverse perspectives. The stakeholders comment that it would be crucial for successful product development to create an effective dialogue and exchange of information / know-how as well as to define a cross-functional interaction between participants. Furthermore, the stakeholders claim that it would be essential to communicate the process in order to establish Customer Process in the company, because this one is only partially known within the company.

Another field of action regards the **Corporate Structure**. Many stakeholders also state that the corporate structure hinders focus more so during the early phase of PEP and it generates a cross-functional interaction as well being innovative. Moreover, the breaking point in PEP at milestone PF is seen as critical by most of those who were interviewed.

The next field of action is about **Requirement Management** because some stakeholders mention that there is a lack of a consistent system where customer requirements could be tracked.

A further field of action concerns the **Behaviour of the Business Division Marketing & Sales**

within the Customer Process and decision-making bodies. Here, the question arises about how strict I/VS demands the implementation of customer requirements, presented at Customer Day "1" and at Customer Day "2". It is nearly the same with the question regarding how they consequently handle price and volume consequences, if the highlights of positioning are not fulfilled.

The next to last field of action deals with the topic **Customer Day / Customer Process**. In general, all stakeholders are of the mind that Customer Process is a good idea, but of course they have some recommendations for improvement. Approximately, half of those interviewed wished for partial detail and more information. Also desirable would be the creation of a more clear understanding of customer requirements. Most of the stakeholders indicated that the "Customer Day 1" as well as the customer requirements are not lasting enough. This means that people do not keep these requirements in mind for a long time. They also mention that no one argues with customer requirements in the course of the downstream process. Moreover, a couple of stakeholders do not know the concept of Customer Process yet and therefore it is unclear to them how Customer Process interacts with the Attribute-Based Development Process and with PEP.

The last field of action involves the **Corporate Culture**. The stakeholders report that Audi is strongly focused on competitors and therefore that it is hard to find the typical Audi character in order to position the vehicle compared with its competitors. Due to that, Audi often tries to do everything 100 percent instead of developing a clear defined product with strengths and weaknesses. Another point made by a lot of stakeholders is that the "policy" within the company and the partial lack of faith between business divisions makes the implementation of customer requirements more difficult. Furthermore, more consistency in decisions from the top management is also desirable. In addition, one stakeholder claims that most of the decisions are made by the top management board instead of the management one level above. This level of decision making should be strengthened.

4.3 Success-Critical Fields of Action for the Optimisation of the Customer Process

Because there are a lot of fields of action which could not all be considered in this thesis due to the limited time frame, a prioritisation is needed in order to identify the success-critical fields of action for optimising Customer Process.

For prioritisation, the following approach, illustrated in figure 4.10 is chosen.

The success-critical fields of action are identified on the one hand, based on the knowledge in which stakeholders have mentioned which field of action and based on awareness of how relationships among themselves really look. On the other hand, with the knowledge which influences respectively, the benefit they have according to Customer Process.

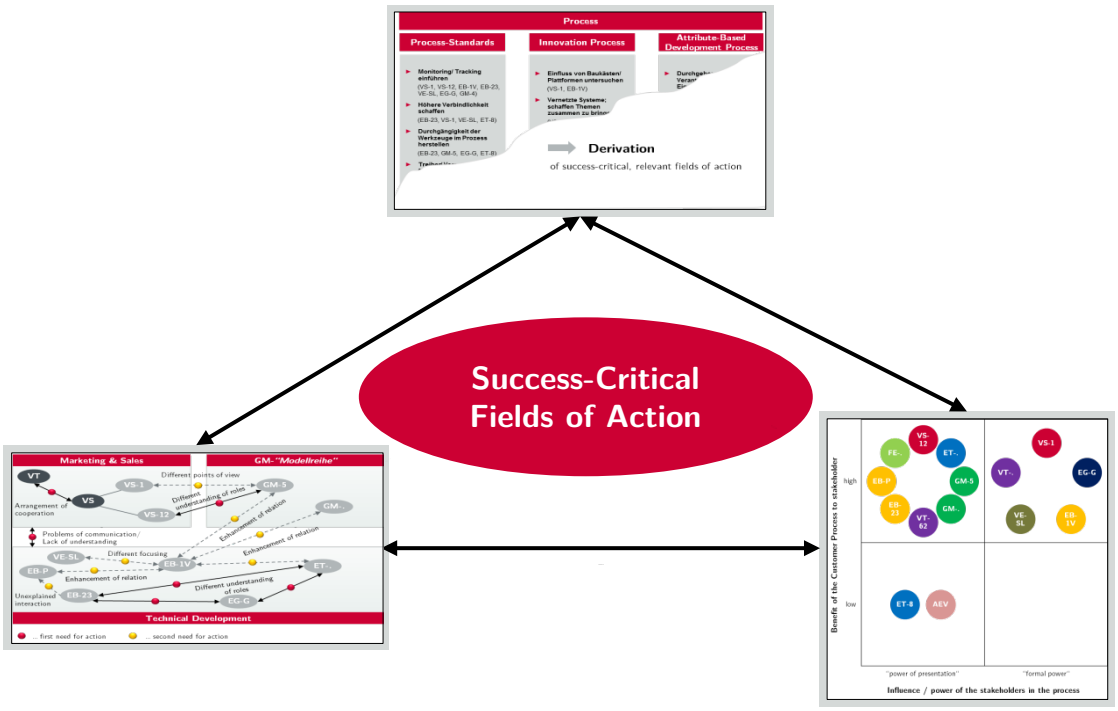

Figure 4.10: Approach Used to Derive the Success-Critical Fields of Action, author's own work

For prioritisation, the auditor and the adviser of this thesis on the part of AUDI AG are called in because of their experience and better estimation of the stakeholders, in order to identify the most relevant fields of action for the optimisation of Customer Process. For the selection of the success-critical field of action, the limited time frame of this thesis has also been considered.

By means of prioritisation and the appertaining discussions, four success-critical fields of action for the optimisation of Customer Process are identified (see figure 4.11).

The fields of action Communication and Corporate Structure are combined into one field of action named **Cooperation Management** because these have a lot of common grounds which can be solved together.

The sub area innovation process is excluded from the field of action Process, as it turns out to be very important in terms of transition to Customer Process as well as relating to the Customer Day "Innovation". Therefore it is defined as a separate field of action and is renamed as **Advance Development Process**, because of the innovation process range from idea generation to a successful market launch (Vahs and Burmester, 2005, p.92). In the context of this thesis, the phase from impulse of innovation to transition into product development is considered in detail.

The Process sphere of activity now only consists of the sub area **Process Standards** and therefore it is renamed because another thesis (Hörmansperger (2013)) is dealing with the sub area Attribute-

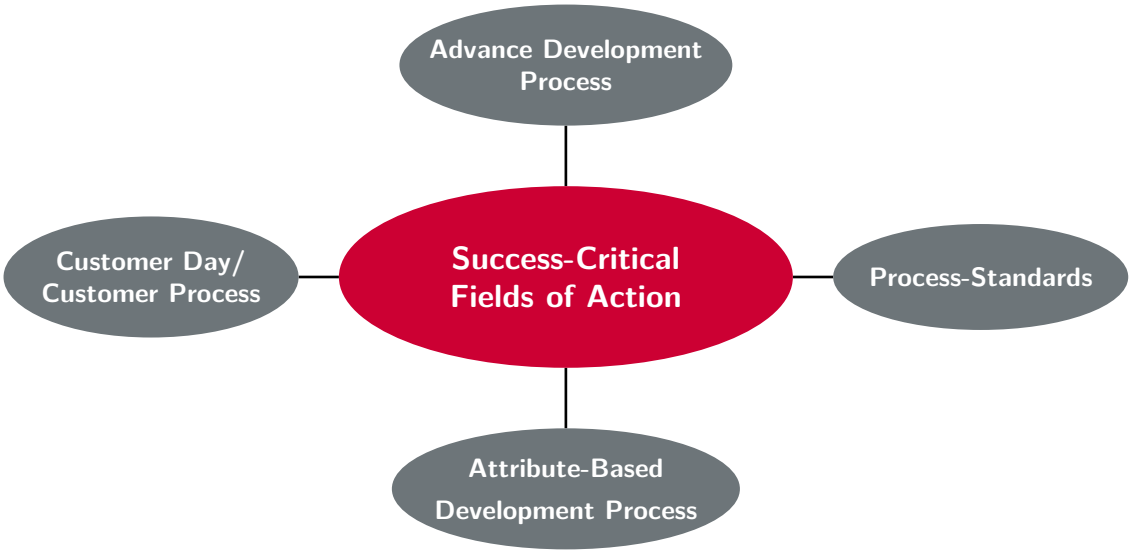

Figure 4.11: Overview of the Success-Critical Fields of Action, author's own work

Based Development Process.

The **Customer Day / Customer Process** remains constant and is also counted among the success-critical fields of action.

The other fields of action, such as Requirement Management and Behaviour of the Business Division Marketing & Sales are not considered in detail, because they are not as urgent regarding content.

The field of action Corporate Culture plays a decisive role in terms of the successful implementation of Customer Process (see section 2.1.3). However, because of the fact that a change of corporate culture mostly takes a long time and that the time frame of this thesis is not sufficient for it, this field of action is not followed up.

5 Recommendations for Improving the Customer Process

When defining the aim of the present thesis, it has been postulated that the critical success factors and optimisation potential of Customer Process should be identified. By the use of stakeholder analysis, most of the potential aspects of Customer Process and its environment are detected. The information from the interviews could be aggregated after a prioritisation of the four success-critical fields of action.

In this chapter, the following four fields of action are worked out and interpreted in the context of Customer Process:

- Customer Day / Customer Process
- Process-Standards
- Cooperation Management
- Advance Development Process

For that purpose the success-critical fields of action including all their sub areas are considered in detail and proposals of solution are presented.

5.1 Customer Day / Customer Process

The first relevant field of action is related to the topic Customer Day / Customer Process. An overview including all four detailed spheres of activity and their appertaining proposals of solution are shown in figure 5.1.

The detailed sub-fields of action, derived from the analysis of the interviews, are:

- Communicating the Customer Process
- Improving the contents of Customer Day
- Classifying the Customer Days to each other
- Formulating the Customer Days and customer requirements more effectively

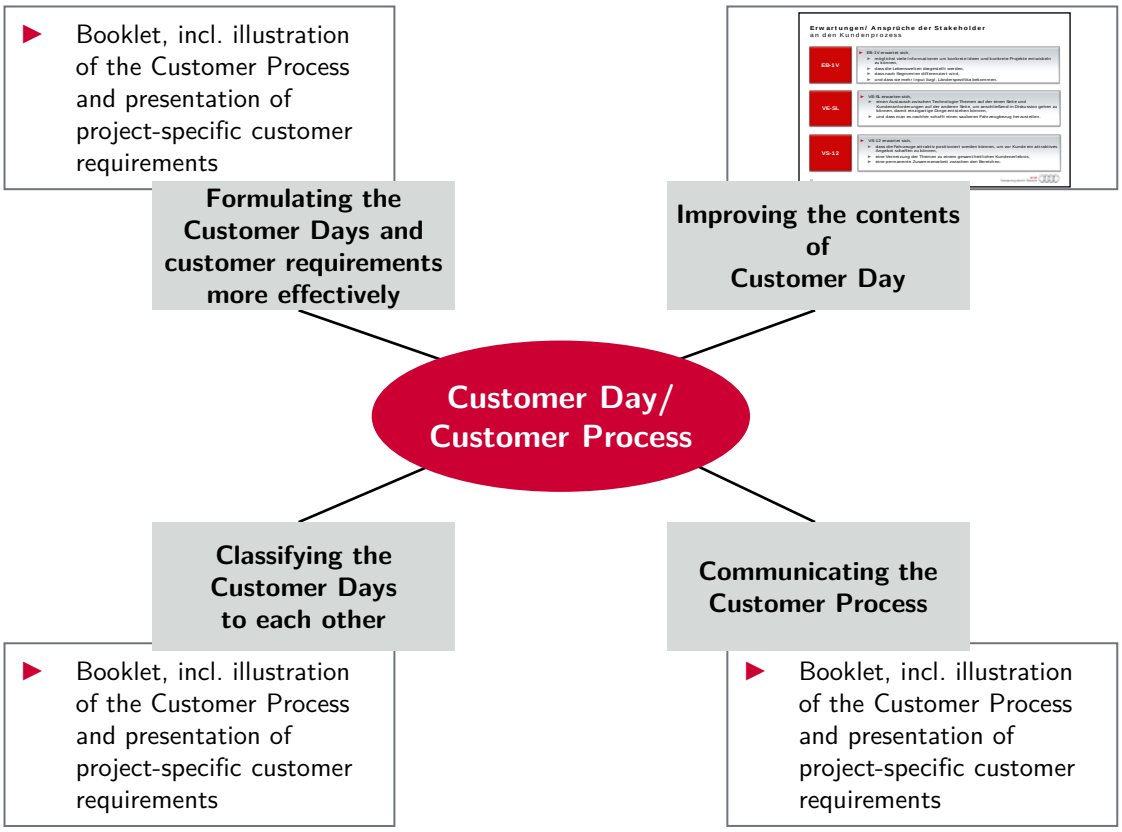

Figure 5.1: Identified Needs for Action Including Their Appertaining Proposals for Solution for the Topic Customer Day / Customer Process, author's own work

Communicating the Customer Process

When the question came up during interviews regarding what the stakeholder is expecting from Customer Process, the majority commented that they do not exactly know what is meant by the term Customer Process. That indicates, that most of the stakeholders do not know Customer Process. This is precisely caused because Customer Process is arranged in the formation phase at the moment. In addition, the whole Customer Process with its different Customer Days has not been communicated yet within the company. In order to successfully implement Customer Process within the company, an early involvement of all affected departments is essential to avoid resistances and conflicts (see section 2.1.3). At the time of the interviews only the Customer Day "1" (see section 3.2.1) has been presented to the company. Therefore, it is essential to communicate the whole concept of the Customer Process, to establish it in the company, so that the involved departments can prepare themselves for this process. Another important aspect for communicating the Customer Process is that today, the Customer Day "1" is not regarded as an event which assesses the quintessence in the company. This facet is not present in the enterprise at the moment. In addition, the interviews indicate that there are differences in the understanding about the definition of customer requirements, between Marketing & Sales and the Technical Development. Due to that, it is important to explain what is meant with the term "customer requirement" form a Marketing & Sales's perspective and to get across how customer requirements are derived from trends, studies, etc.

Classification of the Customer Days to Each Other

In order to communicate a conclusive concept of Customer Process, it is important to classify Customer Days in terms of content to each other. Due to the fact that Customer Day "Innovation" has been added lately, and will be organised for the first time for the Audi A3- successor, the tasks, goals and especially the content of Customer Day "Innovation" and Customer Day "1" must be clearly defined by each other.

Formulating the Customer Days and Customer Requirements More Effectively

Most of the stakeholders expressed the belief that customer requirements are not lasting enough, this means that people do not keep customer requirements, presented at Customer Day "1", in mind for a long time. They also mention that no one has argued with customer requirements in the course of the downstream process. Therefore, the essential point is to formulate customer requirements more effectively in order to ensure that people can argue with the content in further process. Two stakeholders mean that it would be important to experience the environments of the customers

personally to be able to anchor these more effective. Formerly at Audi, so-called *"Experiences"* have taken place for this where participants from PPT and partially from the involved departments are flown to the main markets in order to personally sample how people live there and to establish an understanding for the culture and the special requirements, needs and demands of the markets. If one experiences something personally, it stays in mind a little more than if one gets the subject told in a lecture.

One stakeholder from the Technical Development notes that if he cannot imagine a requirement, because he has not seen it, then he cannot support this requirement with emphasis. Moreover, he mentions that the employees from Technical Development do not believe everything one-to-one from Marketing & Sales and he also expresses that this faith is also not available at 100 percent vice versa. Therefore, it is important to get an own picture of all these things. A further advantage of *"Experiences"* is that contacts between team members are sustained. One disadvantage of *"Experiences"* is that the participants receive an impression from the actual situation there, but it would be more interesting to undergo the future needs of the customers, like an *"Experiences of the Future"*.

Here, the importance lies in the description of customer requirements with whose derivations in a very detailed and simple to understand way, in order to provide more confidence and to gain better acceptability on the part of Technical Development.

Another stakeholder floats the question, to which extent customer requirements, customer structures and attitudes flow into day-to-day business up to the constructing engineer, because the group of participants do not reach up to the single constructing engineer on Customer Day "1".

In order to cope with these three fields of action, which are described before, the following proposal of solution is recommended:

The solution is a booklet, which consists of two parts, one general part and one project-specific part. In the introductory, the reasons and the philosophy of Customer Process are highlighted to accentuate the need for Customer Process. In the general part, Customer Process is illustrated and the tasks and objectives of each Customer Day are described in detail to be able to communicate the process. This should be the initiation to reconsider the whole process and the assignment of Customer Days to each other. In this part, the definition of customer requirements and its common derivation from a Marketing & Sales perspective should be depicted in general too. In the second part, the process-specific part, customer requirements, which are presented at the event Customer Day "1", are accurately explained for the specific car. In addition, the approach of how the particular customer requirements are gathered from trends, studies etc. should be explained in order to be able to relate to these.

In order to bring the book to bear, it should have a handy size, to take it easily along with you, so that users can consult it at any time. In addition, it should include vivid figures in order to gain

better acceptance. Finally, contacts are should still be named so that they can be contacted in case of questions.

The suggested booklet is a good and pragmatic proposal for solution in order to communicate Customer Process, to classify the Customer Days to each other in the course of the creation of the booklet and to formulate customer requirements more effectively.

Improving the Contents of the Customer Day

The last sub-field of action is about improving the contents of Customer Day. In the course of the interviews the stakeholders comment only on the Customer Day "1" because, as mentioned before, they did not already know about another one. Thus, many stakeholders demand the contents presented at Customer Day "1". All expectations of the stakeholders are listed as follows:

The stakeholders expect

- more country-specific inputs,
- a close integration of single topics to one customer experience,
- a clear understanding of the product requirements on the part of the market, specified to the 3 main regions Europe, China, and USA,
- a more sustainable design of Customer Day,
- more accurate feedback from sales regions,
- that the voice of the internal customer is also consulted,
- that one creates an even higher understanding of the different cultures and their requirements,
- that Customer Day is arranged so that one can easily understand the customers and
- that one is satisfying the subject, that the whole vehicle is increasingly cross-linked with its environment.

5.2 Process-Standards

In the course of the interviews a lot of problems are mentioned by the stakeholders, which can be assigned to the field Process-Standards. This is about basic fields of action, which are essential for the smooth flow of a process. An overview of these fields of action is illustrated in figure 5.2.

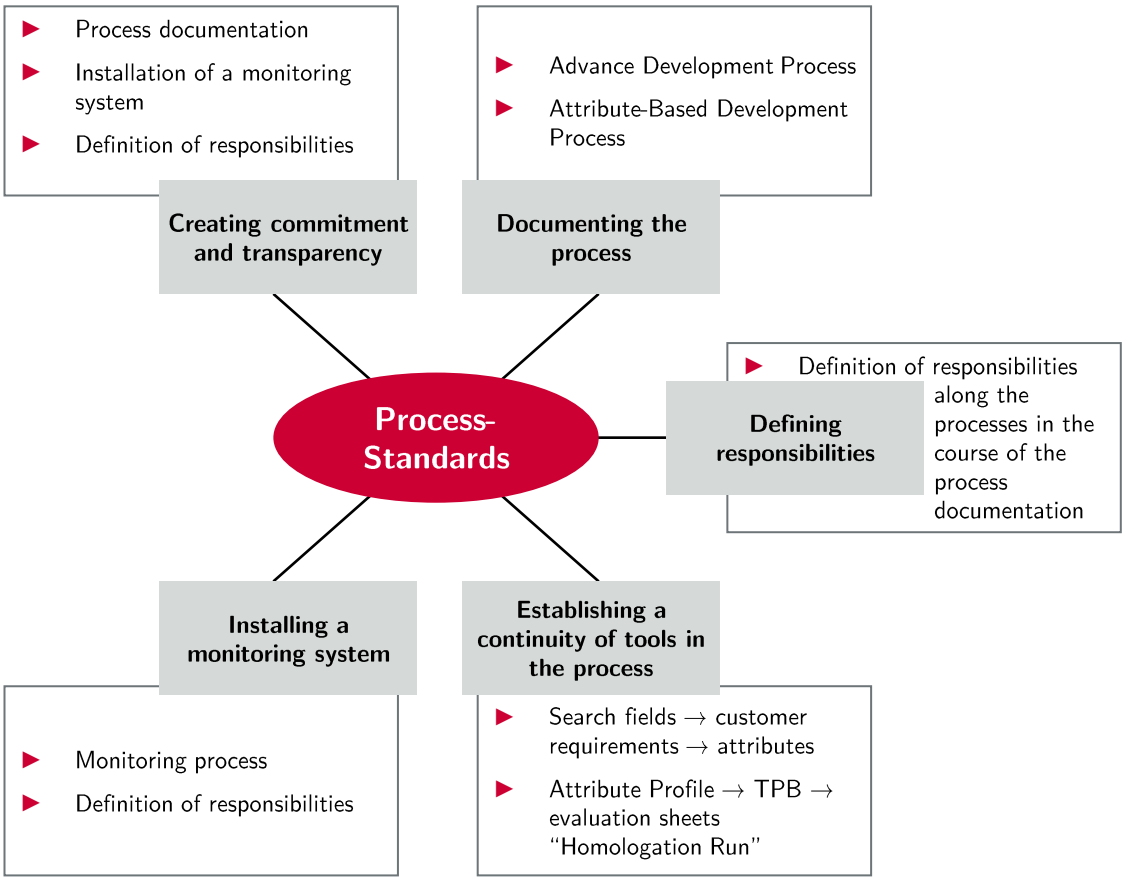

Figure 5.2: Identified Needs for Action Including Their Appertaining Proposals for Solution for the Topic Process-Standards, author's own work

Significant factors in implementing new strategies or concepts are the processes within a company. The basic prerequisites for good cooperation are well-defined and documented processes. Therefore, to successfully integrate customer orientation in the company, the internal operations or processes must be adapted.

Here it is crucial to get away from so-called *"Operational Islands"* that emerge from hierarchy and functional barriers, towards processes that sensitise individuals to the needs of an overall process. It is important to understand the effect an action has for the department before or after the process. The focus is on the generation of customer value and not on the optimisation of a single function, in order to generate a corporate understanding. The management of interdepartmental

tasks brings a number of problems with it. These include a lack of transparency, error rates, control- and coordination problems, due to an inadequate or incomplete dissemination of information. Moreover, by the mutual compartmentalisation of the involved departments, dysfunctions arise which do not add value. Due to not clearly defining co-operations between departments and responsibilities, communication breakdowns can occur under which the customer is ultimately the bereaved, because the customer receives something else that does not meet his/her demands. (Friedli and Schuh, 2012, p.153-155)

This is exaggeratedly shown in figure 5.3.

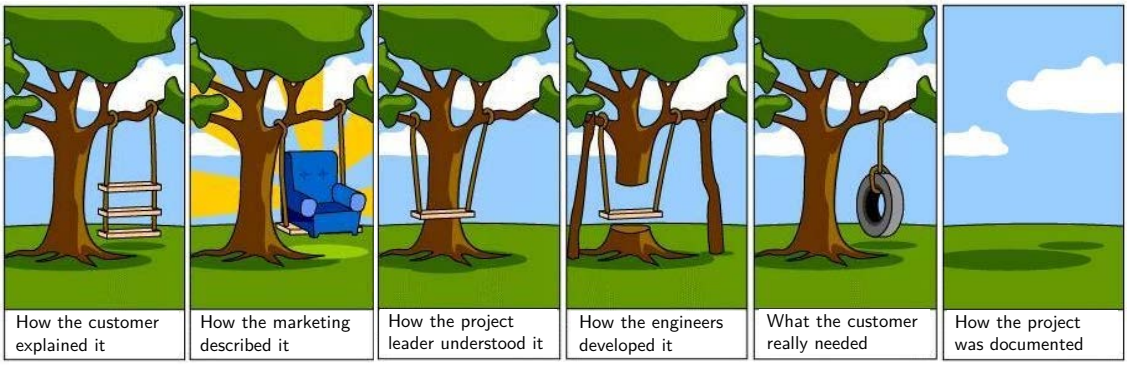

Figure 5.3: Effects of Communication Breakdown, cf. (Friedli and Schuh, 2012, p.155)

To avoid these problems, an **accurate description of the processes** is necessary, which clearly defines who is responsible for what and when. PEP at Audi provides a framework with appropriate milestones, but does not accurately represent the process of the product / attribute planning phase. This concerns mostly the phase between Customer Day "1" and Customer Day "2", which is not clearly defined here, respective of which is currently changing. The interviews reveal that there is a lack of detailed process documentation and that this process is not established and communicated in the company yet. Therefore, firstly a documentation of the product / attribute planning phase is required.

A very important part of the process description is the **definition of responsibilities**. That means, who is responsible for what and when. The interviews show, that the responsibilities at Audi are currently not clear. In the context of the interviews, the understanding of their role, the motivation as well as the power of the stakeholders were queried to get a sense of who the leaders are to better position these departments. It turns out that is not clearly defined from the perspective of the stakeholders, who the driving force of the process is. Another indicator, indicating that the roles are not clearly regulated in the process, are the unexplained responsibilities between I/EB-23, I/ET-. and I/EG-G, which have already been mentioned in section 4.2.2.

As part of the thesis from Hörmansperger (2013) the Attribute-Based Development Process has been set up in an inter-divisional team. Also, the establishment of this process has already taken

place, because the most important milestones of this Attribute-Based Development Process have been included into the PEP of AUDI AG. The phase of the advance development before PS of a new vehicle is described in this thesis and is treated in detail in section 5.4.

As part of the process documentation, the responsible departments were already assigned to the respective steps. A detailed description of the processes is arranged, for reasons of confidentiality, in the appendix of this thesis (see Appendix B and Appendix C).

In addition, the majority of stakeholders mention, that there is a **lack of rigour in the process**. In order to ensure the smooth running of described processes, the contents as well as the used tools have to be built consistently with each other. Basically, hereby it is meant that consistent records accompany the process. Furthermore, it is essential that Customer Process perfectly interact both with the Advance Development Process and the Attribute-Based Development Process . Thereby, it is meant, that the search fields, created in the phase before PS of the vehicle project, must be converted into requirements, which are presented at the Customer Day "1". These requirements should already be formulated in that way so that they fit in the used schemes, such as the attributes, in order to minimise the additional expenses and the error rates in the translation. Another important point is that afterwards, the Attribute Profile, which includes these translations, is converted into the TPB to ensure a consistent customer focus downwards to the component level. This transfer does not take place today, but the need has already been recognised and the Technical Development is working on a solution. One possibility is that the entire Attribute Profile is incorporated into the general part or into a separate part of the TPB as a specification of customer or market.

At the end of the process, just before SOP, the so-called *"Homologation Run"* occurs, where the vehicle attributes are assessed on the basis of an attribute list. Here, the management board evaluates the markedness of attributes using a grade from 1 - 10. For example, if one attribute has a target grade of 8, but the management board only gives a grade of 7, then measures must be defined to close this gap. Therefore, the grade of 8 must be determined in advance in the course of the Attribute Profile, which is not the case at the moment. The problem is that this attribute list matches neither formal nor in content with the Attribute Profile of the beginning of the process. For this purpose, it is necessary to combine these two ends to ensure consistency. This connection is very important to ensure a continuous assessability of the degree of fulfilment of customer requirements until SOP. Using the example Audi A8, the departments I/EB-23 and I/EG-G currently try to match these two ends. However, this merging is difficult because, as mentioned previously, the responsibilities between these departments are not clearly stated. It is about who has the leading role in the merge.

Another field with an increased need for action, which has been mentioned by many stakeholders during the interviews, is the **lack of a monitoring system**, where customer requirements and their degree of fulfilment get tracked (see section 2.1.3). From one stakeholder, this deficiency is even considered as one of the biggest problems.

Therefore a monitoring process must be established to provide a holistic view along the entire process, from about 2 years before PS up to the SOP. This results in a transparency through which it can be deduced that either new customer requirements need to be taken into consideration, or critical success factors currently used need to be changed or adjusted.

The more dynamic the internal situation and the external environment, the more important the monitoring process is. Due to the rapid change of the environment there exists the risk that certain customer requirements are no longer current and need to be realigned, so it is necessary to detect such changes at an early stage and to evaluate them in terms of their impact. (Spath et al., 2006, p.69)

Since a new car is defined based on attributes, the monitoring process also has to be performed based on these attributes.

The Customer Days "2" and "3" as milestones in the Customer Process are used to check the degree of fulfilment of customer requirements through technical solutions and are designed to highlight the consequences, if necessary. Possible consequences may be volume or price reductions on the part of the business division Marketing & Sales. These two Customer Days also offer the ability to trigger, new or changed customer requirements into the process due to rapid change and a long development process. Since these are only 2 milestones throughout the process, a possible proposal of solution would be to set up a continuous monitoring process.

This process must take place, based on an assessment of measures that contribute to the fulfilment of a previously defined field of activity. This field of activity is in turn derived from an attribute which ultimately affects the satisfaction of customer needs. The connection of the assessment is shown in figure 5.4.

From the interview with I/EB-23, it follows that the monitoring of the attributes from PS to milestone KE methodology is available, but it stays open regarding what will happen from KE to SOP. Since, on the one hand, as already described previously, the understanding of responsibilities is different and on the other hand I/ET-. does not continue this monitoring process in the same way as I/EB-23 after KE.

Therefore, it is necessary that even in the monitoring process, the responsibilities are clearly defined. The stakeholders are aware of this importance, but they do not agree on who is responsible for it. Each department sees another department responsible for it, so no consensus occurs. Therefore, the following proposal of solution is to install a superior supervisory body. This control mechanism should go along with PEP and should track the status and degree of fulfilment of customer requirements from a neutral perspective.

Another possibility would be to commit both business divisions of Marketing & Sales and Technical Development to take over the monitoring. Both should give notice if the project bears away. I/GM

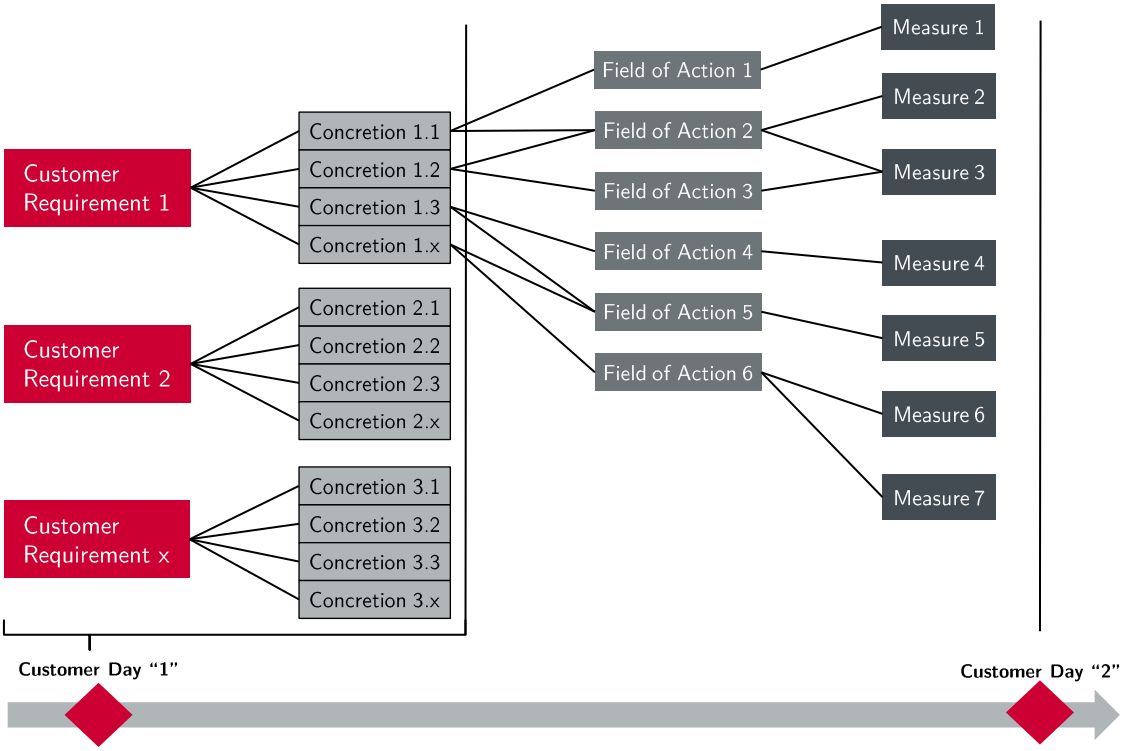

Figure 5.4: Assessment of the Degree of Fulfilment of Customer Needs, cf. (AUDI AG, 2013f)

has to take the position of a mediator and has to act as an agent between those. If a consensus could not be achieved, I/GM has to escalate the problem up to the management board.

Further essential factors for a smooth process flow are **commitment and transparency**. They provide the basis for a steady and trustful cooperation and is conducive to reduce the risk of misunderstanding and conflicts (Vahs and Burmester, 2005, p.359). The stakeholders wish on the one hand, for more engaging participation in processes and on the other hand, for more commitment concerning information and decisions. The acceptance and implementation of the fields of action, mentioned in this section, facilitate commitment and transparency.

5.3 Cooperation Management

Another optimisation potential of the Customer Process is the topic cooperation management. As already noted in section 4.3 the subject cooperation management consists of communication matters and corporate structure issues.

Here the attention is especially turned on the cooperation between marketing and R&D because the literature shows, that this cooperation has the biggest impact on the success of developing new products, by the reason that they are the primary player in the product development process (Griffin and Hauser, 1996, p.195), (Euringer, 1995, p.2), (Moenaert, Meyer, et al., 1995, p.243).

Before being able to enhance cooperation between the two business divisions Technical Development and Marketing & Sales, the potential causes for the differences need to be analysed. Many researchers have found and investigated numerous barriers to accomplish cooperation between Marketing & Sales and R&D (Griffin and Hauser, 1996, p. 195).

Griffin and Hauser (1996, p.195-197) list the identified barriers of cooperation and communication as follows:

- Personality
- Cultural Thought Worlds
- Language
- Organisational Responsibilities
- Physical Barriers

Personality

Gupta et al. (1986, p. 30) found in their study that marketing and R&D managers were similar on many characteristics. Therefore, it is assumed, that the cooperation problems may not be a barrier of personality differences. Griffin and Hauser (1996, p.195) propose that it could be a barrier

of stereotypes. This is the most difficult handicap of all communication barriers, which can be reduced by creating confidence between these divisions.

Cultural Thought Worlds

Marketing and R&D have different world views due to their diverse backgrounds and trainings which are deposited in the cultures of the different departments. Here, there is the risk that self-contained societies arise which signify that the divisions have difficulties understanding the thought worlds (goals, solutions, etc.) from each other, but that is the key for good collaboration. (Griffin and Hauser, 1996, p.196)

Language

These cultural thought worlds also lead to language barriers (Griffin and Hauser, 1996, p.196). Moenaert, Meyer, et al. (1995, p.243) write that a lot of studies on the R&D / marketing interface highlight the role of communication. Moenaert and Souder (1990) and Griffin and Hauser (1996) mention that communication barriers arise, because different divisions use their own technical languages. Due to the absence of corporate definitions of technical terms, a lack of understanding appears and customer needs and technical solutions disconnect, although both groups are of the mind that they are talking about the same (Griffin and Hauser, 1996, p. 196).

Organisational Responsibilities

Griffin and Hauser (1996, p.197) mention the following causes for organisational barriers:

- Different task priorities and responsibilities
- Lack of top management support regarding integration
- Perceived illegitimacy of product development
- Functional success (market share vs. number of patterns)

Physical Barriers

Effective integration and face-to-face communication are handicapped through physical distances. These arise if the divisions are separated and entail decision-making delays (Griffin and Hauser, 1996, p. 197).

AUDI AG has also recognised the significance of this cooperation and therefore one objective of Customer Process is to strengthen the dialogue and the collaboration between these two business divisions.

This is necessary because the analysis of the interviews points out that there are various needs for action to sustain this cooperation. A significant correlation between the problems described in the

literature and the need for action surfaced in the course of the stakeholder analysis is recognisable.

Now, the identified fields of action relating to Customer Process are illustrated in figure 5.5 and considered in detail as follows.

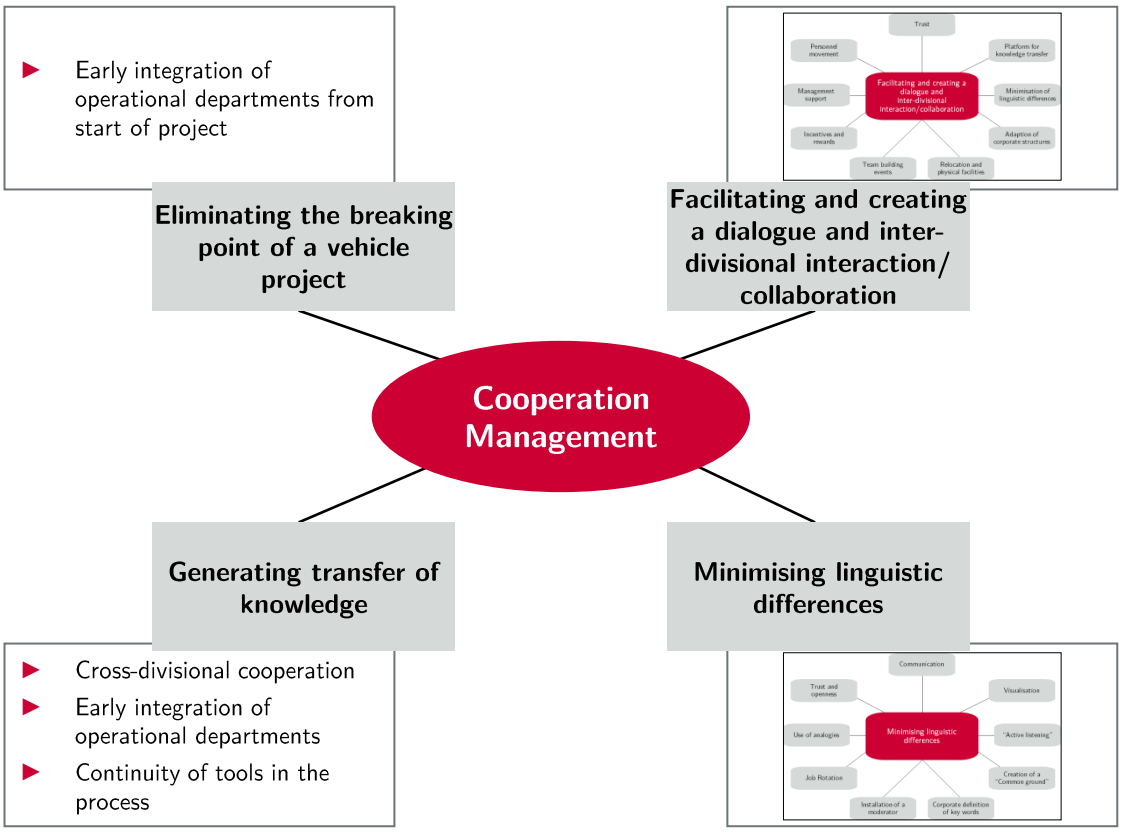

Figure 5.5: Identified Needs for Action Including Their Appertaining Proposals for Solution for the Topic Cooperation Management, author's own work

Facilitating and Creating a Dialogue and Inter-Divisional Interaction/Collaboration

An essential aspect for enhancing the cooperation between business divisions is about facilitating and creating a dialogue and inter-divisional interaction. From the interviews it can be derived that the dialogue and exchange between the particular business divisions needs to be strengthened. Especially in the early phase, this is a substantial success factor. Here, the advance development process described in section 5.4 and the Customer Process are helpful in generating this dialogue.

Moreover, there are some other possibilities for creating a better collaboration between these two divisions. An overview is illustrated in figure 5.6.

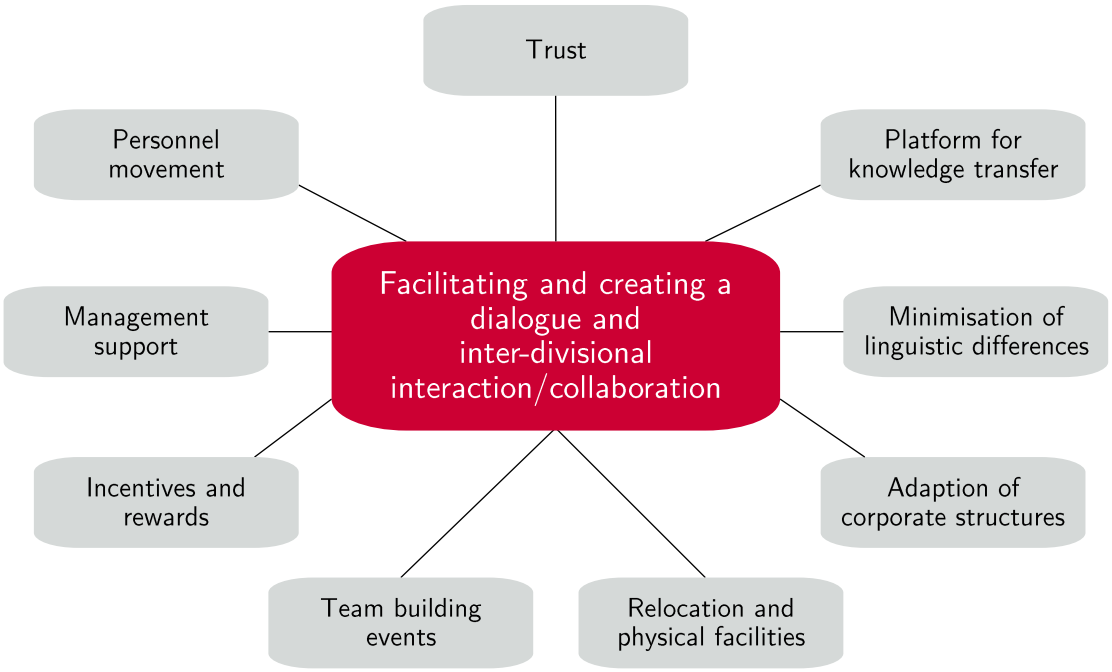

Figure 5.6: Proposals for Solution to Enhance Collaboration, author's own work

One essential factor for enhancing the cooperation between Technical Development and Marketing & Sales is the **minimisation of linguistic differences**. The analysis of the interviews shows that this topic is vitally important for the stakeholders and therefore it is dealt with separately.

In order to strengthen dialogue and collaboration between different business divisions, **relocation and physical facilities** play a decisive role. Due to distance, the communication drops off rapidly and makes it difficult to achieve an information exchange. By reducing the physical separation barrier, the level of communication should be promoted. One proposal of solution to reduce the distance is to co-locate cross-functional development groups in non-territorial spaces. Also one stakeholder mentions that it would be helpful for a vehicle project to co-locate all business divisions into one hall, where engineering and some cars are also located. Here, one could have a short, common look at diverse things in order to establish a corporate understanding. However, co-location is only a partial solution to integrate diverse business divisions, because it is the relationship that enhances collaboration and information exchange (Griffin and Hauser, 1996, p.204-205).

One stakeholder admits that trust between Technical Development and Marketing & Sales has deficits. He/she mentions that engineers do not believe one-by-one what marketeers are telling them and vice versa. Therefore, **team building events** are an adequate method to strengthen the relationship and trust between members of cross-functional teams. Goh (2002, p.25) highlights the importance of trust for good cooperation. In this context, regular cross-functional team meetings

are recommended in the course of advance development before PS, such as they actually take place at AUDI AG from PS of a new vehicle, like the PPT.

A further technique to improve flows across functional boundaries is **personnel movement**. Job rotations provide a better understanding about why decisions are made. In addition, it reduces linguistic differences because it brings knowledge of the other's language with it. Through personnel movement contacts and friendship-based links can be forged, which are important for good cross-functional coordination. (Griffin and Hauser, 1996, p.205)

Griffin and Hauser (1996, p.208) also mention that **incentives and rewards** are an effective integrating mechanism. Often the business divisions are evaluated on their individual functionally based performance (Coombs and Gomez-Mejia, 1991), quoted by (Griffin and Hauser, 1996, p.208). One aspect for increasing motivation in teams would be group rewards. Cross-functional team members should have the same goals, which promote trust and facilitate productivity. (S. Holland et al., 2000, p.244) They should also be measured by achieving these goals. The stakeholders respond to the question whereby their performance is measured, that they are quantified on individual, department specific goals. In order to achieve a better cooperation it is suggested to define common goals for cross-functional teams whereby all team members are measured.

Minimising Linguistic Differences

As also alluded in the literature, the majority of stakeholders indicate the linguistic differences between Technical Development and Marketing & Sales, which exacerbate the collaboration of these business divisions. On the one hand, these linguistic barriers are conditioned by the "different" languages embossed through diverse terms. One stakeholder expresses it accurately with the words "Marketing-Deutsch" and "Ingenieur-Deutsch". As an observer of meetings with members from both divisions, you often get an impression that they are thinking about, that they are discussing exactly the same topic, but in reality they do not mean the same thing. This happens as a consequence that each division uses its own set of technical terms and without having a defined common ground for conversations. On the other hand, linguistic differences occur based on the different perspectives and mindsets of the Technical Department and the Marketing & Sales department. These differences especially emerge in the product definition / product planning phase. Here, it is a question for example of the different perceptions of customer requirements or the positioning of the vehicle. One stakeholder mentions that customer requirement for a member of the Technical Department is the demand of a real existing person but not the anticipation of customer needs from trends and milieu research.

Due to the fact that cooperation between Technical Development and Marketing & Sales is essential for a successful product development, the following proposals for solution to minimise the linguistic differences are recommended (see figure 5.7).

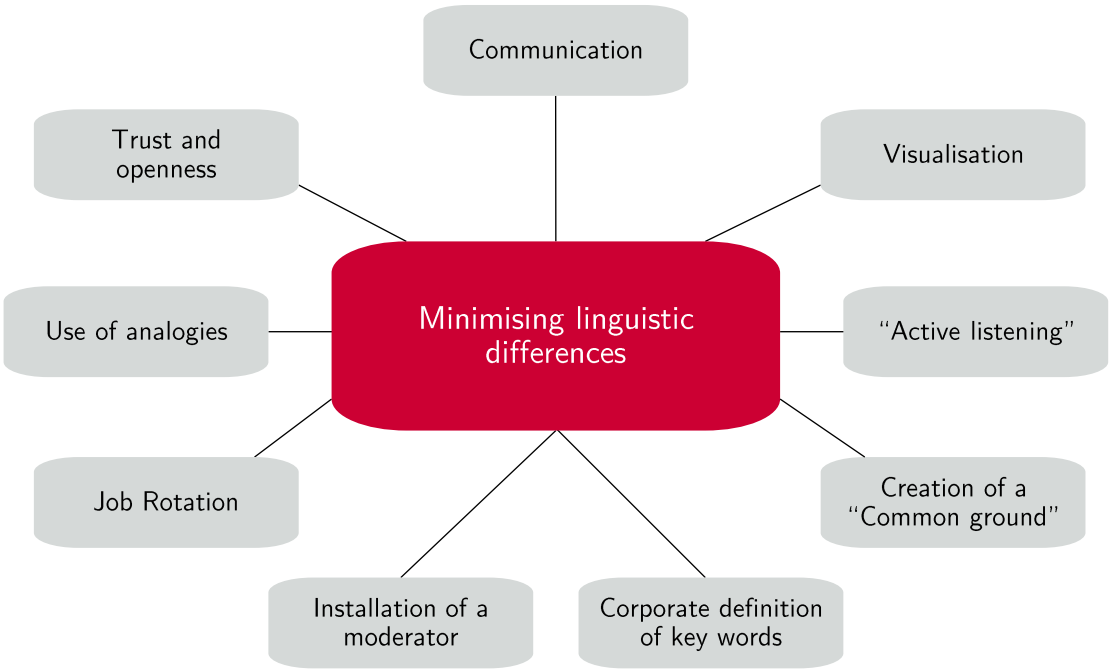

Figure 5.7: Proposals for Solution to Minimise Linguistic Differences, author's own work

A precondition for a bidirectional communication between the communication participants is a common cognitive basis. H. H. Clark (1996, p.93) speaks in relation to this from a so-called *"common ground"* between two (or more) individuals:

> *"Two people's common ground is, in effect, the sum of their mutual, common, or joint knowledge, beliefs, and suppositions"*

Between R&D and marketing the danger exists that due to their different backgrounds, trainings and languages, that the "common ground" is distinct in a small way, so that communication problems can occur. Therefore, it is important to create a "common ground" for this cooperation. In the case of AUDI AG the attributes would be qualified for this, because they build the link between both divisions. Also the generation of analogies for a better understanding can cause a short-term "common ground" (see section 2.1.3).

For Schulz von Thun (2008, p.140-149) information is applied as incomprehensible if is complicatedly long and formulated in a non-concise way, if it shows a bad structure and does not include any stimulating elements. Here, the aspect of the complexity becomes important. In order to counteract this complexity, it is recommended to visualise as much as possible, to create a common picture in people's mind. Moreover, one should try to generate an experience of customer requirements and living environments as well as of technical aspects and innovations as early as possible in the process, in order to generate better comprehension.

Due to the fact that both divisions use different technical terms, it is essential to install and also to communicate a corporate definition of some key words to reduce problems of understanding. Another possibility for this problem would be job rotations, because with that option, sympathy for the diverse structures and intellectual approaches is established. Therefore, the openness for new things is crucial.

Two further approaches to minimise linguistic differences are to enquire if the communication partner has understood the information and active listening. Active listening is important on the one hand to make accessible how information is appreciated (enquired) and on the other hand to show, that the information is understood by the listener. The precondition for this is the desire to understand the other ones. (Felsing, 2006, p.408-409)

In order to implement all these solution approaches in discussions, meetings etc., it is recommended to install a moderator to coordinate the meetings and who is aware of communication hints.

Generating Transfer of Knowledge

A further aspect for strengthening the cooperation between business divisions and customer orientation is the enhancement of generating the transfer of knowledge and information (see section 2.1.3). The majority of stakeholders are of the mind that knowledge transfer is an essential success factor and that all participants along the PEP should have the same information. The stakeholders regard the handover of the vehicle project at milestone PF from the strategic departments to the operative departments as crucial. The chances are that information will become lost. Therefore, a potential success factor for a smooth information flow is the early integration of operative departments. This is one key factor and therefore it is considered in detail in the next sub-field of action.

The sub-fields of action mentioned in this section make also an essential contribution for a better knowledge transfer. Goh (2002, p.25) mentions that a strong cooperative and collaborative culture should accompany the transfer of knowledge between individuals or groups.

Most of the stakeholders see room for improvement in the sharing of information within the organisation and indicate that often "political" causes hinder the information flow. Goh (2002, p.28-29) identifies that often-times hierarchical barriers block the transfer of knowledge. Therefore, leaders play an important role in establishing the trust and conditions required to facilitate knowledge transfer. They should act as role models and have to show willingness to share information and to seek it from others in the company. With their behaviour, leaders will influence the culture of the organisation and the employees will emulate them.

For intra-organisational knowledge transfer, the usage of information technologies is frequently recommended in the literature, providing that a willingness for sharing information exists within

the organisation (Goh, 2002, p.25). At AUDI AG the particular vehicle projects often have no own drive where the involved individuals are able to share information among themselves. Here, it is suggested to install at least such a corporate drive. For the time being, it would be more suitable to install a platform like a social network, where the employees of different business divisions can share information and can communicate together. Behind this, a common drive is provided where all the relevant data of one vehicle project of all the involved departments are saved. This proposal of solution would facilitate the flow of information and would enhance the communication between project members. Such a platform would also be useful for discussing new ideas in the course of the Advance Development Process in order to implement some kind of open innovation.

At least the different tools used along the PEP, as mentioned in section 5.2, must be harmonised in order to generate a smooth information flow. Hence, it is secured that the subsequent department in the process has all information at one's disposal, by building upon the tools of each other.

The smooth flow of information along the PEP also contributes to an increasing transparency of the particular vehicle project.

Also the booklet, mentioned in section 5.1, contributes to better knowledge transfer of the customer requirements into the product development within AUDI AG.

Eliminating the Breaking Point of a Vehicle Project

In general, the PEP can be coarse divided in two phases, the product planning / concept development and the serial development. Therefore, the business divisions are also divided in two groups. On the one hand, there are the more strategic departments responsible of the product planning and on the other hand there are the more operative ones, responsible for implementation in serial production. At a certain moment in the process at milestone PF, including a transition phase, the project is officially handed over from the strategic departments to the operative ones. Here, a so-called breaking point occurs, because other employees continue the project often-times without knowing why some decisions are made as they are. Thus, there is a high chance of loosing information. Nearly all business divisions have recognised this problem and therefore the project leaders of the operative phase are involved at PS of the vehicle. Only the business unit Marketing & Sales keeps up this breaking point. This is seen as dangerous from the stakeholders. On the one hand, it is more difficult for the operative departments on the part of Marketing & Sales to understand why decisions are made and why the vehicle is positioned in this way, etc. On the other hand, it is also more difficult for the other business divisions because they must adapt themselves to a new partner with for instance, new ideas and requirements.

The following proposals of solution are only related to the business division Marketing & Sales, because the other ones are not affected by this problem. It is suggested to dissolve the breaking

point at PF and to involve all operative departments at PS. It would also be possible to implement one team consisting of members of the strategic and the operative departments, which runs through the PEP together, only changing the leadership at PF. Consequently, the strategic direction of the vehicle is also monitored until SOP, because the strategic department does not leave the process at PF.

This bisection also affects Customer Process with its Customer Days, because the operative department is responsible for Customer Days "3" and "4". As a result of another team, the execution of these Customer Days could be different than the audience would expect. Therefore, it would be constructive to have a continuous process where Customer Days are built upon each other and are carried out in the same way. Therefore, the installation of a neutral team could be considered which is responsible for the realisation of all Customer Days. In addition, this team could monitor the different vehicle projects from a market/customer point of view and could take over the tracking of the Customer Process as a kind of controlling function (see section 2.1.3).

5.4 Advance Development Process

The last huge success-critical field of action is called Advance Development Process. As mentioned before, one objective of the Customer Process is the identification and implementation of a Unique Selling Proposition (USP)s for a vehicle project to inspire customers. Hence, advance development plays a decisive role in order to achieve this. Therefore, this sphere of activity includes various aspects, ranging from a lack of a vehicle-oriented advance development to influences of tool-kits and platforms in order to cover all identified weaknesses. An overview of these fields of action with suitable proposals for solution is shown in figure 5.8.

The stakeholders agree about the fact that one of the biggest problems is the **lack of a process** in order to get the innovations in the right car at the right time. At present, the advance development of AUDI AG works uncoupled from the PEP and unrelated to a specific vehicle project. This leads to the problem that innovations often reach their capability of series production too late for the specific vehicle. One stakeholder even mentions that sometimes innovations are in progress forever and never reach the transition into the market. Many stakeholders are of the mind that one cause for this could be that Audi is strongly focused on serial production and the phase shortly before SOP. These capacities must be transferred to the early phase of PEP in order to be able to define, to position and to plan the new vehicle successfully. That would also prevent problems at the later phase of the process. Therefore, it is essential to **direct company's attention to the early phase** in order to achieve an awareness for the importance of this phase relating to company success.

> *"Innovation excellence may be more than just a means to gain competitive advantage; it could be critical to the survival of the company..."* (KPMG, 2014, p.50)

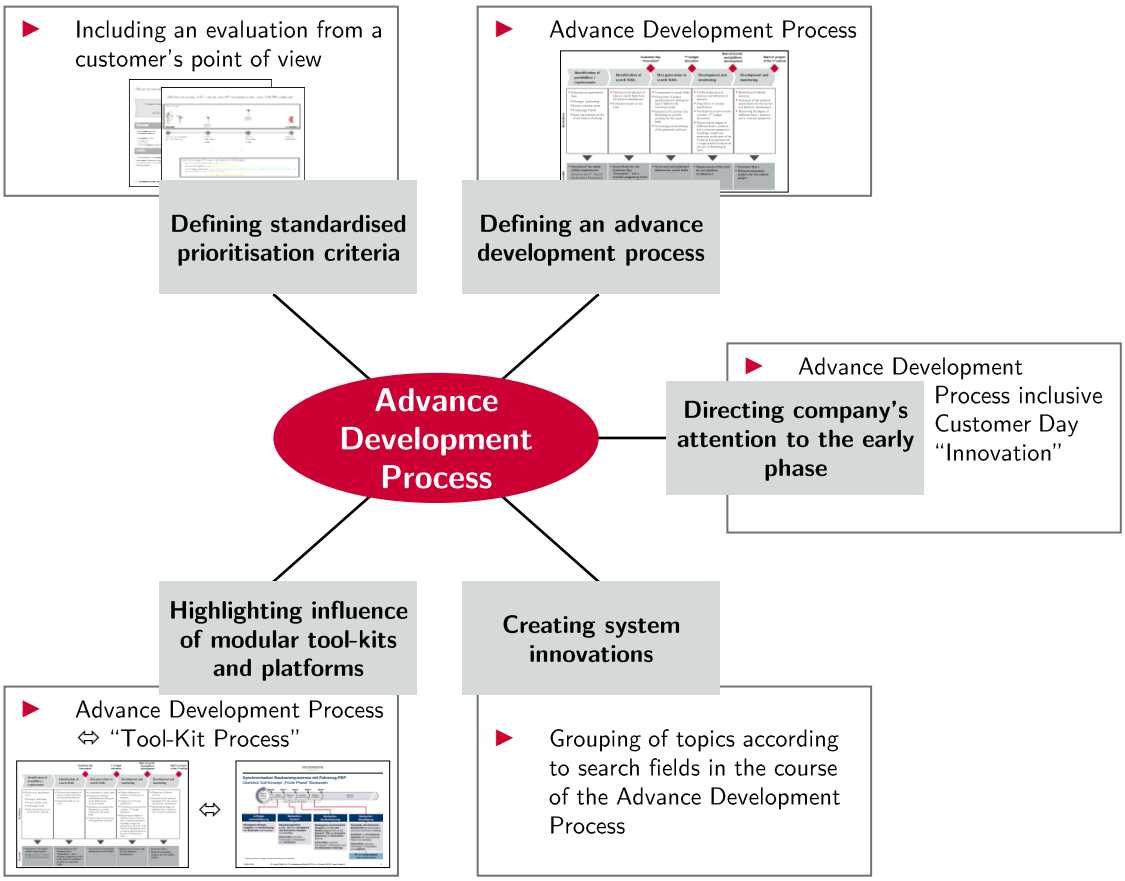

Figure 5.8: Identified Needs for Action Including Their Appertaining Proposals for Solution for the Topic Advanced Development Process, author's own work

Another decisive point to generate successful innovations is to **create system innovations** instead of single ones, because more and more automotive functions become interlinked. Whereas one device used to have one single function in the past, more and more devices will be used for two and more purposes in the future. (Wyman, 2007, p.12)

The maturity of stakeholders is conscious of that and thinks that it is crucial to link diverse topics to develop an experience for the customer. But they indicate that therefore, a change in the organisational structure and in the corporate culture is also needed. For instance, at present most of the innovations are invented by single employees often in the "silent cubbyhole". In order to develop system innovations the particular developers should interact with each other.

Therefore, as described in section 5.3, rewards and incentives could bear a helping hand for generating cross-functional system innovations.

Further influencing factors for advance development and for the fulfilment of customer requirements are the different **modular tool-kits and platforms** of Volkswagen AG. Noteworthy are the Modular Transverse Tool-Kit (MQB) and the Modular Longitudinal Tool-Kit (MLB).

These tool-kits form a specific framework for the used vehicle projects with the objective of achieving synergy and the reduction of complexity over vehicles and vehicle classes. Thus, the tool-kits purport the basic technical guidelines for the vehicle projects used. (Volkswagen AG, 2012, p.4)

In general, a vehicle can be divided into platform and body. With the term platform, the undercarriage of the vehicle is meant. The body contains all design dependent parts, visible and delight for customers. The objective of the platform is to use a high amount of same parts for similar vehicles and vehicle classes, in order to define a common technical basis for them. The brand differentiation is normally effected by the body. (Volkswagen AG, 2012, p.5)

On these platforms the various vehicle derivatives are built up. An overview for a better understanding is shown in figure 5.9.

This modular tool-kit strategy has become the basis for model policy and development work in the automotive industry. It has various advantages such as reduction of development time and costs, decrease of purchase prices due to economy of scale effect. In addition, the modular tool-kit strategy ensures more flexibility for the future because it enables more products in less time at lower costs with better quality and higher complexity. (Braess et al., 2013, p.1136-1137)

However, this strategy also poses some challenges. On the one hand the OEMs try to develop as many same parts as possible, but on the other hand a differentiation from a customer point of view must be ensured. Thereby, a clearly defined positioning of each vehicle becomes more important. (Esch et al., 2013, p.84-85)

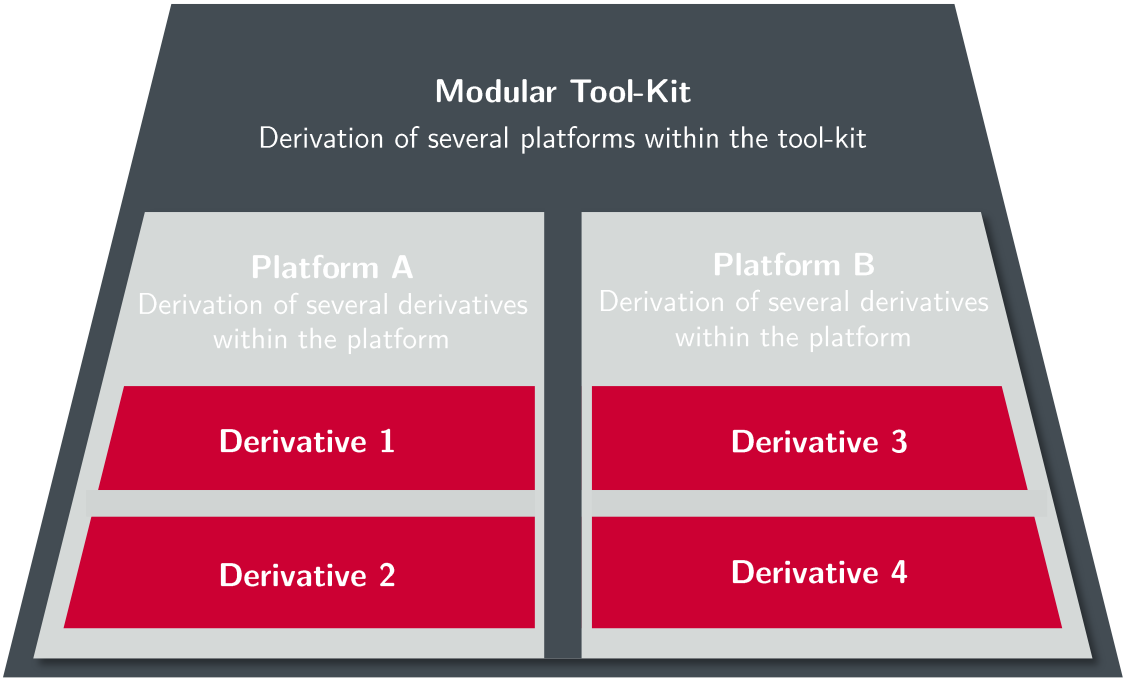

Figure 5.9: Derivation of Different Derivatives on Platforms within the Tool-kit, author's own work

Many stakeholders indicate that the modular tool-kits extremely limit the implementation of customer requirements. Sometimes it is even impossible. If a module/ feature is not designed for a modular tool-kit it is difficult and expensive to bring it into the designated vehicle. A further problem is the complexity within a modular tool-kit. At present, 16 diverse derivatives are developed based on the MLB. This leads to an immense effort in order to consider all requirements and to a high coordination within the different brands. At the beginning of the development of a new generation of a modular tool-kit, all requirements of the particular vehicles must be collected. In consequence of the huge amount of vehicles with different SOPs, it could be that sometimes requirements for a new car have to be known many years before the real PS of the vehicle. The result is a lack of planning reliability. Within the Volkswagen AG the point in time for developing a new modular tool-kit is not fixed. At the moment an across the group agreed process is drawn up, in order to synchronise the PEP of a vehicle with the so-called *"Tool-Kit Process"*.

In general, the development of a platform starts approximately half a year before PS of the first vehicle based on it. Therefore, the real game changers should be known to ensure due implementation into the platform. Thus, it is also necessary to synchronise the development of the platform with advance development.

All the findings of the interviews point out a need for structuring the early phase before PS. The objective is to propose a process which considers the following requirements:

- Developing a coordinated process for getting innovations into the car
- Providing possibilities for developing system innovations
- Directing company attention to the early phase
- Synchronising this process with the Tool-Kit Process

Therefore an Advance Development Process has been proposed by coordinating between I/EB-1V, I/EB-23 and I/VS-12. An overview of the developed process is illustrated in figure 5.10.

This process connects on the one hand the theoretical view, especially according to Sandmeier, Jamali, et al. (2004) (see figure 2.5) and on the other hand the practical view of AUDI AG.

Identification of Possibilities/Requirements

The starting point of front-end activities is an analysis of the strategic situation, where a company is situated. Here, the strategic positioning of AUDI AG is considered in detail. In the course of the identification of possibilities for innovations all activities are geared to the perception of the chances and risks of the environment (Specht et al., 2002, p.129). Possibilities could be found out on the one hand through the identification of potential future customer needs ("Market Pull") and on the other hand through the analysis of promising technology potentials ("Technology Push"). The business division Marketing & Sales at AUDI AG compiles future customer demands due to trends using diverse studies. Also the behaviour of the various markets is analysed. In contrast, Technical Development explores future technologies. In addition, further already known requirements from the actual product planning are considered. The result of the first phase is a catalogue of potential future requirements for the planned vehicle to be. In section 5.3 the necessity of a "common ground" between these two business divisions is highlighted. Therefore the attributes have been proved to be appropriate. Thus, this catalogue of future requirements should be based on the second level of the Attribute Framework (see section 3.1.5).

Identification of Search Fields

The search fields are defined based on the analysis of possibilities for innovations and the description of the identified demands. They present the connector between the possibility for innovations and the idea generation. The search fields form the framework for the activities, focusing on concrete problem solving, in order to classify the multiplicity of identified ideas. Hence, the idea generation could be arranged more efficiently. Here, a first prioritisation takes place. (Vahs and Burmester, 2005, p.143)

This means that in this phase, a derivation and pre-selection of relevant search fields for advance development occurs. Moreover, the identified search fields are described in the form of uses cases. The outcome of the second phase is the identified search fields for Customer Day "Innovation". These are assigned to the attributes in order to make concrete the setting of tasks.

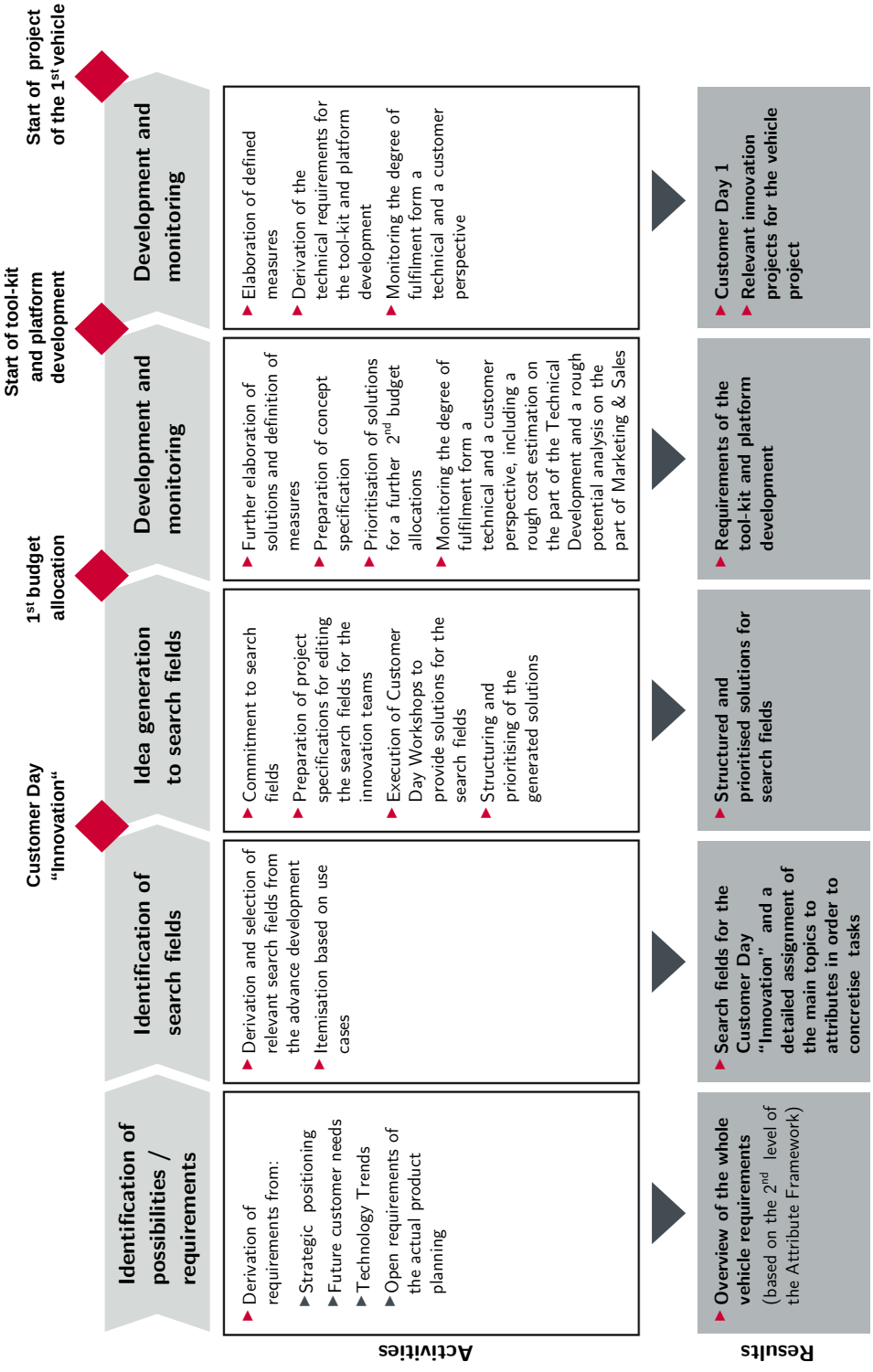

Figure 5.10: Overview of Advance Development Process, author's own work

Idea Generation to Search Fields

The starting point for the idea generation is the Customer Day "Innovation", which should take place approximately two years before PS of the to be planned vehicle, in order to have enough time for idea generation and following development. In the context of the Customer Day "Innovation" the identified search fields are presented to the management board. An affirmation and assignment of Technical Development occurs.

Afterwards, the idea generation starts in the course of so-called Customer-Day-Workshops. Here it is essential to bring the specialist of the several special fields together in order to create system innovations. These workshops also provide a chance for open innovation. Experts from other industries, suppliers, customers etc. could be invited to generate proposals for solution together.

A further possibility of open idea generation is the usage of idea markets which tie the wisdom of the crowd. A virtual platform could provide the basis of an idea market where employees of the company could bring in new ideas, comment and optimise the ideas of others. (Soukhoroukova, 2007, p.101), (Rudzinski and Uerz, 2014, p.295-297)

The identified ideas and proposals for solution are structured and presented subsequent to a decision making body, where they are prioritised. The end of the third phase forms the so-called *"Budget Allocation"*. Here, those ideas should be selected, which promise future success with high probability. Then, these are fitted with money for first research and development activities.

Development and Monitoring

Approximately 1,5 years before PS the first development activities start. The proposals for solution are followed up and measures are defined. The selected solutions are subjected to further potential analyses. On the one hand the market potential is analysed, and on the other hand the technological feasibility is proved and a rough business plan is developed. Based on these data, the solutions are prioritised again for a further Budget Allocation. In parallel to these activities, a monitoring of the degree of fulfilment takes place from a technical and a customer point of view.

The objective of this phase is to provide determined requirements for the modular tool-kit / platform development for the reason that these innovations are in the destined vehicle at the right time. The development of the modular tool-kit / platform starts about a half year before PS of the future planned vehicle.

Afterwards, detailed technical demands for the modular tool-kit / platform development are deviated and for this purpose measures are developed. A continuous monitoring of the degree of fulfilment from a technical and customer point of view is essential.

The Advance Development Process is finished with the PS and the Customer Day "1". The

innovation projects are handed over to the vehicle projects, where these are developed further towards series-production readiness. At Customer Day "1" further customer needs are presented and triggered into the vehicle project. Here, the crossover to the product planning and concept development takes place (see section 3.1.5).

For confidential reasons, a detailed process description including all responsibilities is shown in the appendix (see Appendix C).

The last finding of the interviews is the **need for standardised prioritisation criteria and processes for innovations**, in order to be able to select the most potential ideas. At present, prioritisation takes places from a strategic direction and from derivations of Technical Development prioritisations. An evaluation from a customer point of view does not happen for the time being. For Wyman (2007, p.10), this is one factor why innovations often fail.

> *"Automotive companies must increasingly focus their innovation efforts on a very limited number of promising innovation projects."* (Wyman, 2007, p.10)

This has already been recognised on the part of Audi and is worked on now. In this connection it is about an optimisation of Marketing & Sales input for the prioritisations of advance development projects. This sub-field of action is not considered in detail as part of this thesis.

6 Final Remark

The continuous shortening of product life cycles paired with an increasing trend of customer-oriented products at a constant cost and complexity increase demand for the flexible and fast reactions of companies on changing conditions to secure long-term survival on the market. Thereby, the customer is spotlighted in the course of product development. While marketing-oriented business divisions already track customer orientation, the product development is mostly dominated by a technical product orientation. The result is an over-engineering of products, including unused product features, which appear as cost drivers. This leads to a lack of customer satisfaction. Therefore, it is important to align the development activities with the needs and requirements of customers, because customer orientation is a crucial success factor for product development. Although strategic customer orientation is meanwhile counted among one of the key business objectives and the fundamental importance of a comprehensive knowledge about customer requirements in product development is well known in research and practice, there are many deficits in the implementation of customer orientation in product development. The identification of customer requirements demonstrates only a first step in a wide-area process. Without a well-directed forwarding and a user-oriented format, customer information is useless for the company. Only through a systematic integration into the company and its processes is an effective use of this information possible.

AUDI AG has recognised the importance of customer orientation and has fixed it in its strategy 2020. In order to successfully integrate identified customer requirements into Product Development Process (PEP) Audi has created the Customer Process.

6.1 Summary

In the present thesis, the objective is pursued to identify success factors and optimisation potentials in the Customer Process, in order to establish this process at AUDI AG. The literature analysis conducted at the beginning of this master's thesis provides the necessary knowledge of the subject matter, relating to customer orientation as well as customer-oriented product development. Here, the term customer orientation, its challenges in the product development stage and in implementation within the company are considered in detail. In the next step, a general model of a PEP in the automotive industry is described in order to generate a fundamental understanding of the sequence of a vehicle project. Especially, the characteristics of the early phase, which is essential for

a successful product, are highlighted in the course of the research. Afterwards, the literature review focuses on customer-oriented product development. Here, the importance of customer integration and the different roles, which customers can assume in the course of developing new products are presented. In order to effectively integrate customer demands into product development a few instruments like the Conjoint-Analysis, the Kano-Analysis and the QFD-Method are used. The detailed literature review ends with an overview of customer-oriented product development at AUDI AG. In order to better understand the subsequent empirical investigations, the organisational form and the project organisation at AUDI AG are discussed briefly. An overview of product planning and concept development shows their approach to the development of new vehicles. To arrange product development more in line with customer needs, the business division Marketing & Sales has created Customer Process. With the aid of Customer Process, the identified customer requirements are contributed to the PEP and whose degree of fulfilment is monitored in sequel. For this purpose, 5 different so-called *"Customer Days"* with diverse tasks and goals take place during the project, in the form of milestones, where the requirements are compared with actual existing technical solutions. In addition, measures are defined to achieve these needs and consequences are derived in the case of non-fulfilment. Finally, Customer Process and Attribute-Based Development Process are described in detail. Attribute-based Development Process provides the basis for how customer requirements, presented at Customer Day "1", should be continued in the further progress of PEP.

The empirical study deals with the identification of success factors and optimisation potentials in Customer Process. In order to analyse all departments (stakeholders) involved in the early phase and to identify which demands, motivations and interests they have, a stakeholder analysis is conducted. Therefore, the approach of the stakeholder analysis, adapted to the needs of the Customer Process, is derived from literature. In the first instance the affected departments are identified and the relationships to each other are surveyed. Based on expert interviews with the identified stakeholders their motivations, interests, power / influence and expectations related to the Customer Process are analysed. At the last step of the approach, all findings of the stakeholder analysis are grouped to superordinate fields of action. Based on the multitude of identified optimisation potentials, a prioritisation is conducted in order to identify the success-critical fields of action. Following this, four success-critical fields of action for the optimisation of Customer Process arise out of this prioritisation:

- Customer Day / Customer Process
- Process-Standards
- Cooperation Management
- Advance Development Process

Finally, potential proposals for solutions related to the success-critical fields of action are described and concrete suggestions for improvement for optimising Customer Process are developed.

6.2 Conclusion

Customer orientation gains more and more importance in a competitive environment. Therefore, the identification of customer demands and their effective integration into product development is essential to satisfy customers and thus to increase company success. In order to achieve this, it is necessary that all involved departments pull together. The stakeholder analysis, conducted in this thesis, shows that a lot of diverse departments with different "stakes" need to be considered in the framework of the Customer Process. Due to the fact that Customer Process is situated in the initial stage, the awareness of this process within the company is relatively low. In contrast, all stakeholders know Customer Day "1" and are sold on the idea of integrating customer demands into product development. But, it is recognisable that not all stakeholders have realised the benefit of Customer Process for themselves to 100 percent yet. Here, it is necessary to give the affected stakeholders an understanding of the benefits of Customer Process for their daily business, so that all can pull together. One striking result of the analysis of the stakeholders is, that the officially leader of the PEP does not have the "right power" for this, which of course complicates the management of this process. Therefore, it is essential to bring this department into the position where they are able to force and manage the process effectively. The study of relationships between the stakeholders shows that there are some relations with a high need for action. It is about problems of understanding up to different understanding of roles which hinder departments to stick to the process. These problems should be solved previously.

Out of the expert interviews, conducted in the course of the stakeholder analysis, numerous fields of action are educed. After a prioritisation, the success-critical fields of action are worked out. In the following, the most important findings out of these are illustrated.

In the field of action **Customer Day / Customer Process**, especially the expectations, stakes and suggestions for improvement of the stakeholders relating to this topic are considered. For a successful implementation of Customer Process within AUDI AG, it is essential to communicate this concept within the company in order to establish Customer Process as an accepted process. In order to achieve this, it is also necessary to formulate the customer requirements presented at the Customer Day more effectively, so that employees can keep these demands in mind for a long time. Due to the fact that Customer Day "Innovation" was added later to the Customer Process a clear classification regarding presented contents between Customer Day "Innovation" and Customer Day "1" is needed. A booklet containing on the one hand, customer requirements for a specific vehicle project and on the other hand, the concept of Customer Process in general, is suggested as a solution for these problems. Moreover, ideas for the improvement of the stakeholders according to the Customer Day "1" are listed in the present master's thesis.

In the course of the interviews a lot of problems are mentioned by the stakeholders, which can be assigned to the sphere of activity **Process-Standards**. One success factor is a detailed process description between Customer Days "1" and "2". Here, the assignment of responsibilities plays

an especially decisive role, which is currently not clearly defined. This process, named Attribute-Based Development Process is used to trigger the customer requirements into the PEP and therefore into technical target values according to the Quality Function Deployment (QFD) approach. In addition, a monitoring of the degree of fulfilment has shaped up as one optimisation potential. Moreover, a lack of rigour in the process could be identified. The elimination of this problem results in a smooth running process and in a better knowledge transfer among the different departments along the PEP. A further essential factor for a smooth process flow is a high degree of commitment and transparency.

As a further optimisation potential of Customer Process, **Cooperation Management** has been found. This consists of communication matters and corporate structure issues. The interviews show that facilitating and creating dialogue and inter-divisional interaction is an essential aspect for enhancing the cooperation between business divisions. In the early phase especially, this is a substantial success factor. For strengthening the dialogue, some proposals for solution are mentioned in the course of this section such as relocation and physical facilities, team building events, rewards, etc. One of the most important success factors is the minimisation of linguistic barriers between the business divisions Marketing & Sales and Technical Development. These speech differences, which influence cooperation immensely, can be traced back to their different backgrounds, trainings and languages. For the necessary overcoming of these linguistic barriers a common ground is decisive. It is also essential to install and to communicate a corporate definition of some technical key terms to reduce the problem of understanding. In addition, job rotations bear a helping hand for appreciating the cultural thought worlds from each other. A further very important aspect for strengthening the cooperation between business divisions and customer orientation is the enhancement of generating transfer of knowledge and information. Here, a continuity in used tools is seen as especially successful for a smooth information flow, which is not currently the case at AUDI AG. For this, the elimination of the breaking point in a vehicle project at milestone Product Feasibility (PF) also plays a crucial role. At this milestone the vehicle project is officially handed over from the strategic to the operational departments. Thus, there is a high chance of losing information. Therefore, it is necessary to involve operational departments in a passive role from Start of the Project (PS).

The last huge success-critical, relevant field of action for the optimisation of Customer Process is about **Advance Development Process**. It is also very important, that this process is aligned with customer orientation to generate Unique Selling Proposition (USP)s. Currently, there exists a lack of a process in order to get innovations in the right car at the right time. Another problem is that Audi is strongly focused on serial production and the phase before Start of Production (SOP). Therefore, it is necessary to direct company attention to the early phase. A further crucial aspect, which has a huge impact on customer-oriented product development, is the modular tool-kit and platform strategy of the Volkswagen AG. Thus, customer requirements must be identified at an early stage, for the reason that these could be considered during the development of these tool-kits. In this thesis an Advance Development Process was defined in a cross-divisional team, considering all relating findings from the interviews. For this, the theoretical perspective from the literature

as well as the practical perspective of AUDI AG were combined. The objective is to identify customer needs at an early stage in order to have enough time for their development. Thereby, the development of tool-kits can be also influenced in time. By means of this process and of Customer Day "Innovation", company attention can be directed to the early phase.

Summarised, the results of this master's thesis as well as the recommended proposals for solution should effect Customer Process in a significantly positive way if these are implemented consequently.

6.3 Future Prospects

The prepared results in the present thesis highlight some starting points for further research activities. The aim of this thesis was to identify success factors and optimisation potentials as well as appertaining proposals of solution. Therefore, this master' thesis overviews all fields of action and offers potentials for further deep research. One essential aspect, which has not been treated in this thesis due to the time limit, is the corporate culture. In chapter 2 the importance of the corporate culture for customer orientation is highlighted, which offers a potential for further research. Here, the generation of customer-oriented culture is required.

However, the most important success factor for optimising Customer Process, is the implementation and consideration of the presented suggestions for improvement within AUDI AG. Partially, this has already happened, but for most of the fields of action it is due. For example, in further progress it is necessary to communicate the proposed Advance Development Process in order to establish it within the company. Due to the big reorganisation within AUDI AG at the end of this thesis, which contains the recommended elimination of the breaking point at milestone PF, the developed processes must be reworked regarding new responsibilities. Moreover, the explanatory notes of the stakeholders regarding the Customer Day need to be introduced into further Customer Days, to arrange these more effectively.

Due to the steady increase of technological progress and therefore of complexity as well as of mature markets, customer orientation becomes more and more a decisive competitive factor for companies. Therefore, it is essential that Customer Process must not be seen as a one-time project, but as a long-term, continuous process. Therefore, Customer Process must be spurred on and also the PEP from milestone PF until SOP, including Customer Days "3" and "4", must be considered in detail to optimise the whole process. AUDI AG must also think about, whether the integration of customer-related information into the PEP is sufficient or if it would be even more effective to actively integrate the customers in person. Throughout the whole product development these could occupy different roles. In the area of innovation management, this "open innovation" approach has become more and more important.

Figures

Tables

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Appendix A

Interview mit ……

Abteilungsbezeichnung

- Interviewprotokoll -

Datum/ Uhrzeit:
Ort:
Anwesend:

Fragen/Antworten	Anmerkungen
Teil A: Prozess allgemein 1. *Wann startet … mit dem Prozess?* 2. *Was sind die wesentlichen Aufgaben von …?* 3. *Welche Informationen benötigt … am Anfang, von welchen Schnittstellen kommen diese?* 4. *Was sind die wesentlichen Teilschritte des Prozesses? Wie sieht der Prozessverlauf aus?* 5. *Was ist das Ergebnis/Ziel des Prozesses?* 6. *Wer führt den Prozess weiter?* 7. *Wann wird der Prozess übergeben?*	

Teil B: Kundenprozess spezifisch 8. *Was erwartet sich … vom Kundenprozess, bzw. welche Ansprüche hat … an diesen?* a. *Was würde … die Arbeit erleichtern?* b. *Welchen Nutzen hat der Kundentag / Kundenprozess für …?* 9. *Welches Rollenverständnis hat …? Wie sieht … seine Rolle im Prozess?* a. *Welchen Einfluss/ „Macht" hat …?* . 10. *Welche Motivationen/ Ziele/ Interessen hat … die Kundenanforderungen umzusetzen, bzw. zu tracken?* a. *Woran wird … gemessen?* 11. *Welche Schnittstellen gibt es innerhalb des Kundenprozesses?* a. *Gibt es welche die problematisch sind? Falls ja, welche und warum?* 12. *Wo sieht … Schritte/Stellen/Knackpunkte innerhalb des Kundenprozesses, welche die Umsetzung der Kundenanforderungen verhindern?* a. *Lessons learned, was muss man anders/ besser machen?*	