Professional MBA
Entrepreneurship & Innovation

Innomization

– a new innovation approach –

A Master's Thesis submitted for the degree of
"Master of Business Administration"

supervised by
UNIV.PROF.DR. **Christopher Lettl**

DI(FH) **Karun Haschemi** | DI **Martin Atassi**
0227078 | 9725457

Vienna, July 26, 2010

Affidavit A

I, **Karun Haschemi**, hereby declare

1. that I am the sole author of the present Master's Thesis, "Innomization", 123 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
2. that I have not prior to this date submitted this Master's Thesis as an examination paper in any form in Austria or abroad.

July 26, 2010

DI(FH) Karun Haschemi

Affidavit B

I, **Martin Atassi**, hereby declare

1. that I am the sole author of the present Master's Thesis, "Innomization", 123 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and

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July 26, 2010

DI Martin Atassi

Abstract

This master thesis addresses the product innovation process of companies. Based on an intelligent combination of innovative core methods, a new approach for an innovation process arises. The described and evaluated Innomization model consolidates different methods to a new innovation procedure. The included elements are focusing on customer behavior, customer needs and customization of products. The evaluated research question of the master thesis focuses on the improvement of a classical product development process to a dynamical one by integrating customers and their customer data. Studying the relevant literature in combination with a quantitative and qualitative research approach about the core elements of innovation in general shows, that a need for a different innovation approach is extensive. The master thesis further reveals that an integration of such an approach occurs a shift in the mindset of the employees and a change of the company culture as well. Based on the findings and consecutive integration in the model, the Innomization approach is extended, furthermore a prospect for an in-house integration as well as an entrepreneurial venture concludes this master thesis.

Keywords: innovation, product development, customization, customer behavior, customer data, customer needs, data mining, analytics

Preface & Acknowledgment

The telecommunication market in Austria is one of the most competitive one in the world. Revenues and therefore incomes of companies decreased continuously within the last few years in the main market fields. Working for a company, which has its business in a fast moving industry, enables insights into the product development procedure within the fixed and mobile communication market in Austria. The pressure, produced by the competitors and the shareholders, increased year by year. The product managers are faced with the challenge to create new products, which are different and unique but also easy to handle inside the company processes and, of course, asked by the customers. Caused by the high competition and the speed of the product developments the eco-system has changed within the last years. Several innovations had influenced the relationship to the customer. Examples are the upcoming application stores on mobile devices but also the net-books, iPads, e-books and home automation devices. The telecommunication companies have to find and to defend their position inside the value chain. The revenue streams are changing and some of them are decreasing while others are arising. New products are asked to gap the decreasing revenues of established products. This leads to investigate in the innovation process to cover the needs of the customers as good as possible.

The general procedure used within this master thesis is shown in Figure 1, where important findings are extracted from effected chapters and then summarized as integrations to come up with a final thesis result. The content of the master thesis is shown in Figure 2, where the contingency of words are shown in a tag cloud (see Chapter 1 for a full content description).

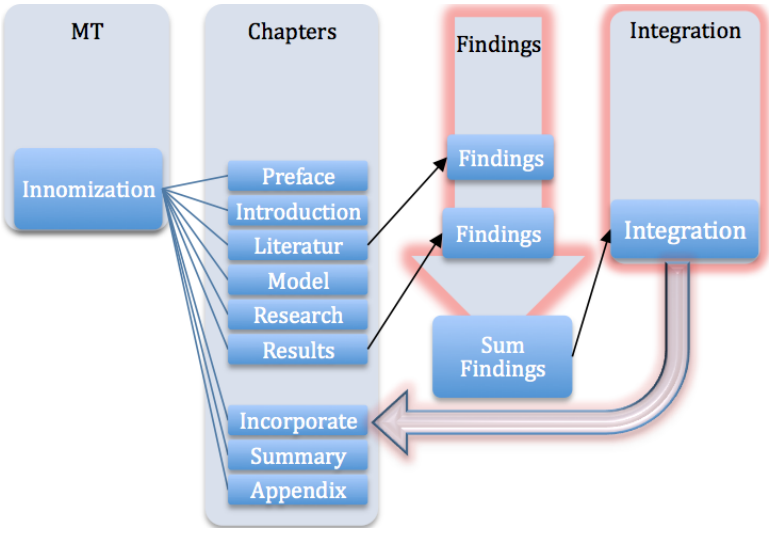

Figure 1: Master thesis structure

Figure 2: Tag cloud

Acknowledgment

Thanks to my love Silvia, my sister Diana, my parents Ghania and Baset and to all my friends for supporting me to finish my study.

Martin Atassi

To my charming Ingrid the mother of my three little children, and to Setareh, Zarifeh and Azade, three wonderful daughters who have disrupted and enriched my life more than I ever could have imagined. And thanks to my new friends that I got to know during the MBA studies, for the intensive and interesting discussions.

Karun Haschemi

Contents

List of Abbreviations

4P's	Product, Price, Placement & Promotion
CAGR	Compound Annual Growth Rate
CDA	Confirmatory Data Analysis
DA	Data Analysis
DM	Data Mining
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EDA	Exploratory Data Analysis
ICT	Information Communication Technology
Imp	Importance
IT	Information Technology
NPD	New Product Development
ODI	Outcome Driven Innovations
OpCo	Operating Company
PC	Product Customization
PCA	Principle Component Analysis
RFM	Recency, Frequency and Monetary Value
Sat	Satisfaction
SVD	Single Value Decomposition
SWOT	Strengths, Weaknesses, Opportunities & Threats

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Chapter 1

Introduction

> "The purpose of business is to create and keep a customer."
> (Drucker, 1967)

Given the increase capabilities of computing power, sophisticated mathematical algorithms and data storage, where massive amount of customer data are collected and stored simply because it is so cheap and not because of some prior defined needs, new, rich possibilities of using and gaining insights into the data have evolved (e.g. Han & Kamber, 2006; Hand et al., 2001). Asking customers what they want rarely leads to breakthrough products and innovations (Burgelmann et al., 2009; Ulwick, 2005). Using static product development approaches with standardized, process based on funneling methods have already shown their disadvantages and driving towards the end of their life (e.g. Järrehult, 2009). New innovation methods like lead-user method, co-creation and open innovation in general have shown up and are currently on the forerun (Chesbrough, 2006; von Hippel, 2005; Prahalad & Krishnan, 2008).

Product customization and a correspondent personalization are yet an approach to serve all individuals' personal needs and expectation in a long tail market, with a mass production focus (e.g. Anderson, 2006; Mourlas & Germanakos, 2010; Piller, 2009b). However mass customization has its weaknesses due to the company centric value creation and especially caused by a process (business processes and logistics) complicity (e.g. Prahalad & Krishnan, 2008).

Individually, each of the three pillars is solid against each other and can therefore not interact accordingly. This master thesis however, investigates the possibilities of softening these borders and tries to gain the individual interrelated advantages. Focusing on the intersection, beginning at the customer side turning through the company and back to the customer, a new innovation strategy is created, namely the combination of customer data analysis, product development

process and a product customization approach in the widest sense, with the main target to increase customer satisfaction and therefore gain competitive advantage for the company. This combination of **inno**vation and custo**mization** is further named "Innomization" within this text. The main research question addresses therefore: How can a classical new product development process e.g. stage gate, can be changed to a dynamical one by integrating customers and their customer data? This master thesis tries to provide insights to the given question by using a quantitative and qualitative research approach.

The structure of the paper is as follows:

Chapter 1 describes that the importance of structured methods to develop new product increased highly over the last few years. Currently, as indicated in this chapter, the relevance is still increasing. A new approach is needed to overcome the upcoming challenges. The Chapter includes the hypothesis, which represents the investigated research approach of this master thesis and it describes the structure of this master thesis as well.
Chapter 2 describes the relevant literature. The focus is on the strength and weakness of the involved methods. The scope includes the review of literature about data analysis, methods for product development and also mass customization. Although the methods and procedures are not described in detail within this chapter the reader should get an overview about the main idea and the importance in respect to the developed model.
Chapter 3 gives a description of the model itself. The model includes three elements, which are described extensively. The interfaces, between the involved methods, are described as well. The Chapter continues with an overview of the costs to run such an approach. Finally, a SWOT analysis of the model should provide a deeper insight.
Chapter 4 continues with the research approach to investigate the hypothesis and the possibility to apply the model inside different industries. The research approach includes three main pillars: a survey, workshops and personal interviews with subject experts, which are explained in detail.
Chapter 5 then explores the results of the researches. Beginning with the outcomes of the survey and continuing with the main findings from the workshops and the interview sessions. This Chapter gives an in-dept analysis of the findings.
Chapter 6 aggregates and transfers all findings from Chapter 5 in the initial Innomization model. It also analysis the different findings to investigate the overall effects to the model, thus an adapted, suitable new approach occurs.

Chapter 7 gives a summery about the overall result of the research question and finalize this thesis with a prospect of an in-house implementation as well as an outlook of a possible entrepreneurial venture with the new model.

Appendixes A – C of the master thesis includes all graphical representation of the survey, the protocol of the workshops and interviews and the used questionnaire for the survey.

Chapter 2

Literature review

This Chapter discuss the prior research on the three pillars, namely data analysis (DA), new product development (NPD) and product customization (PC), which builds the ground floor of the strategy to a dynamic new product development process, however the last section is focusing on customer segmentation and target marketing due to the inherent importance within this field. There is rarely any literature, which focuses concurrently and directly on the combination of all there building blocks. There has been a lot of research efforts focusing on open innovation (Chesbrough, 2006) and the integration of user (von Hippel, 2005) which combines a product customization approach and new product development. Piller (2009b, p.1), names this as "Other methods to master long tail markets successfully". On the other hand, some research has been done in the field of business decision based on data analysis (e.g. Blattberg et al., 2008; Hand et al., 2001; Jähne et al., 1999) which is summarized as Business Intelligence (BI) (e.g. Vercellis, 2009). Furthermore, banking and financing plays a forerunner role in using customer data especially for customer segmentation and is primarily conditioned by fraud protection (e.g. Bojadziev & Bojadziev, 2007).

Finding 2.1: *An overall, consistent and integrated solution for the the question in research is nearly nonexistent.*

2.1 Data analysis

> "Learning to use a "computer" of this scale [Cluster Exploratory][1] may be challenging. But the opportunity is great: The new avail-

[1]For more Information about Cluster Exploratory see `http://www.nsf.gov/pubs/2008/nsf08560/nsf08560.htm`

> ability of huge amounts of data, along with the statistical tools to crunch these numbers, offers a whole new way of understanding the world. Correlation supersedes causation, and science can advance even without coherent models, unified theories, or really any mechanistic explanation at all.''(Anderson, 2008a)

People and their behavior are irrational but they are systematic and therefore predictable (Ariely, 2008) and with the availability of massive amount of data this can further be explained as a herding effect (Kennedy & Eberhart, 2001). Therefore, Exploratory Data Analysis (EDA), Data Mining (DM) and Confirmatory Data Analysis (CDA) are all different philosophies to predict the answer in question or random discovered data relations. Data mining is a multidimensional field, including K-means clustering, neural networks and classification trees and has its origin in scientific areas but are more and more used in the area of business intelligence (Han & Kamber, 2006). Cross validation (resampling) is an used techniques for DM to avoid over fitting, which is a general concern when algorithms are trying to observe every pattern within one data set (Hastie et al., 2009) and hence EDA is the basis to explore unknown data relation, with tools like Principle Component Analysis (PCA) (Hand et al., 2001) and Single Value Decomposition (SVD) (Elden, 2006) for dimensionally reductions, Data Tours, Cluster - and model-based Cluster Analysis (Martinez & Martinez, 2005) as pattern discovery, and the Graphical Methods (Soukup & Davidson, 2002) for EDA , DM can be seen as an extension to EDA and cross validation (Yu, 2009). On the other hand, CDA is mostly concern with statistical hypothesis testing, confidence intervals, estimation, etc.(Martinez & Martinez, 2005) which will be mostly used after an EDA approach but not with the DM tools which uses resampling as a validation approach.The complex nature of classification, regression, etc. leads to the question of which method and parameters work best for a given problem to solve. Usually, there is no a priori answer to this question and the only way of finding the best solution is by comparing different methods, classifiers, filters with different parameter settings, performance measurements, cost of computing, etc., within the same data set and is therefore seen as art (Good, 1983). For example market segmentation often uses clustering algorithms (von Hippel, 2005) which always results in a subsegment solution no matter of the “true” existent relationships within the data (Blattberg et al., 2008) and, secondly, there will be still a within cluster heterogeneity left over (Franke et al., 2009). However, easy to use software tools, both commercial and open source, have emerged on the market and difficult calculations can now be executed on a single personal

computer (Zeanah, 2004). This, and the continuously collection and storing of massive amount of data, many industries are becoming interested in mining patterns from their databases (Zeanah, 2004).

Finding 2.2: *The possibilities, of using the enormous amount of data, brings new insights and supports therefore todays complex business decisions by using hidden relations within the data.*

2.2 New product development

> "There is a giant wave of innovation going through all company boardrooms – but there are few people that know sufficiently enough about innovation and what their customers' needs are to pursue innovation – and innovate you must! The alternative is death – albeit slow, but still!" (Järrehult, 2009, p. 3)

Stage-Gate has become a very complex, over bureaucratizing idea to launch process to manage a NPD and is mostly seen as hurdle towards innovation caused trough no provision for focus (Cooper, 1994) and less learning opportunities (Sethi & Iqbal, 2008). However relaunches and improvements, such as a scaled version to adapt for risks of a project, integration of iteration loops to incorporate with the customer or user in early phases and a general aperture towards an open system for allowing multiple sources of idea generation, have tried to cope with these problems (Cooper, 2008). Furthermore, recent advantage of the incorporation of Stage-Gate with an open innovation approach lacks in the availability of any methodology and guidance (Cooper, 2008, 2009).The innovation funnel paradigm with its big fuzzy front end and its small opening at the end has been replaced by an open innovation funnel and then extended to an innovation reactor to cope with the inability of forcing radical innovations. Innovation methods like Outcome Driven Innovations (ODI) (Ulwick, 2005), and demographic data, competitor analysis and consumer studies of existing as well as consumer to be, are used to de-fuzzify the front end of the innovation funnel. Retrieving consumer and customer insights, e.g. through interviews, observation, ethnographical studies and to collect technology insights and new, interesting technologies are the main aims within the converging phase. Idea generation methods are used to reach the target goal and with an iterative process of learning the tentative goal is reached. Again with an iterative approach with the use of consumer and customers, the first prototype is steadily improved till the final goal is reached. However to successfully launch the new product, especially in large corporations, still

a subsequent but hopefully shorter stage gate approach is necessary (Järrehult, 2009).Outcome driven innovation (ODI) is based on the fundamental approach that customers only "hire" products if they can resolve a given problem (= Job). Furthermore a market segmentation by jobs offers a clearer path to a successfully innovation and generally creates a much broader market as a product category-defined market caused by the fact that a given job can mostly be served with different kind of products (Christensen & Anthony, 2009). Ulwick (2005), has developed a eight step process[2] beginning from the definition of an innovative strategy to the definition of a breakthrough concept based on the outcome driven innovation approach.There are two fundamental business transformations underways: (1) value is based on one, unique customer experience and (2) companies focuses on access to resources instead of owning them (Prahalad & Krishnan, 2008). This transition implies knowledge about the user's behavior and an early user involvement into the innovation process to provide product or service to satisfy the users needs and to access new sources (Rosted et al., 2009).[3] Customer or user co-created value, requires not only the use of digital, internet related technologies to enable users to participate e.g. toolkits and to handle the massive amount of data, but also to publish user generated designs and to manage and conduct user communities thereby reducing the risk of product failure and market in-acceptance (Lettl, 2010; Ogawa & Piller, 2006).

Finding 2.3: *New innovation method have evolved, integrating customer or users to access new sources for innovation, but are not consistently used on a regular basis.*

2.3 Product customization

> "[...], digitization of business processes, a knowledgeable customer base, and ubiquitous access to information in recent years not only have made it possible to push beyond mass customization but have made it a competitive requirement."(Prahalad & Krishnan, 2008, p. 26)

The advent of long tail markets, where supply exceeds demand, has created new business model opportunities evolving away from "one size fits all" model (Anderson, 2006, 2008b). Based on postponing strategies (e.g. Cottrill, 2004; Wang

[2]For the whole approach see: `http://www.strategyn.com/approach/`.

[3]download the full report at: `http://www.foranet.dk/upload/nni_rapport_final_3.pdf`.

et al., 2010) to reduce the contradiction between sticky information e.g. locus of need information, on the customer side and a local search bias e.g. the locus of solution information at the company side, Piller (2009a), offers five different strategies:

1. Mass customization,
2. Collective customer commitment,
3. Advanced assortment productivity,
4. Embedded toolkits and
5. User manufacture,

beside the traditional approach of sharper forecasting. Mass customization is benefiting from the exploitation of heterogeneities across customers' needs but represents a closed solution space. Collective customer commitment extends mass customization within the involvement of some customers (experts) and let communities co-evaluate new products. The advantage of this method is the pre availability of commitments of potential customers. Assortment productivity increases the efficiency of finding products related to customer needs out of existing variety instead of creating new assortments and addresses directly the "paradox of choice" (2009a). Toolkits enables customers to bundle existing products or services to customer specific ones. User manufactures generate a new ecosystem where individuals can use those companies to create, test, build and distribute their new assortments. Nevertheless, all those strategies enables also some kind of product or service personalization which increases the personal relation between customers or users and their purchased products, which will internal increase the economic value for the customer and therefore creates a higher willingness to pay (Franke et al., 2010). Furthermore products customized on a basis of customers' preferences increase significantly the perceived customer benefits (willingness to pay, purchase intention). Those customer benefits are higher if customer have (Franke et al., 2009):

1. better insight into their own preferences,
2. better ability to express their preferences and
3. greater product involvement.

Companies, which will address those three pillars of product customization, will have a powerful marketing strategy in hand. (Franke et al., 2009).

Finding 2.4: *Product customization increases customer satisfaction. However in the continuum of fully customizable and by all means standardized product, companies have carefully balance between over and undeserving customer preferences.*

2.4 Segmentation & Targeting

> "A company cannot serve everyone in broad markets [...], because the customers are to numerous and diverse in their buying requirements". Therefore a successful company must narrow the markets to segments in which they will serve more efficiently and concentrate on customers where the probability of a closing deal is at highest (Kotler, 2001).

Knowing, that the customer is essential to drive a successful business, there should be a high emphasis in reaching that goal. But what does it mean to know a customer? This question is the starting point of any investigations towards a detailed customer picture, which will be blurredly at the beginning and should result in a clear and bright one at the end of the challenge. The clearest picture of course could be generated if all resources are used to observer a single customer, which is clearly not sufficient from an economic point of view. Therefore grouping customer types in suitable, pattern-driven entities would be a more valuable one but also decreases the requested behavior trueness of the individual one (Kotler (2001)), defines this together with the marketing mix as the first step of a target marketing approach.

A commercial company's success is determined by its earnings before interest, taxes, depreciation, and amortization (EBITDA) where costs are subtracted from the revenues. Therefore a growths strategy can only be reached by either reducing the costs or increasing quantity and the price which will determine the revenue. Price is more or less driven by the market and therefore the amount of goods and services is an opportunity to increase the revenue side of the EBITDA equation. However, goods and services are sold effectively if customers' values are fulfilled more directly as the competition does. The better the customer picture is and the clearer the needs and the problems-to-be-solved are shown to the company the better the goods and services would fulfill the customer's expectations (Andersen & Ritter, 2008).

This chapter gives an introduction in the segmentation process as well as the statistical methods to drive a successful customer picture.

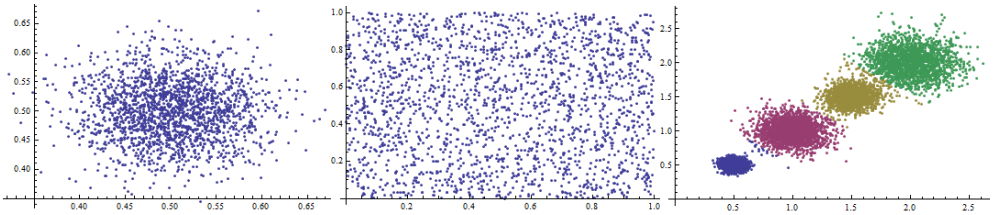
Fundamental remarks

There are four levels of market segmentation which can be applied by a company and Kotler (2001) argues that an implementer must also understand the "patterns of market segmentation" for a proper market segmentation approach additionally to the levels mentioned in Table 2.1 (2001).

Segment Marketing	"[...] a large identifiable group within a market, with similar [patterns]".
Niche Marketing	Niche marketing is a "more narrowly defined group" within segments with a "distinctive mix of benefits" (e.g. Anderson, 2006).
Local Marketing	"Target marketing" [generats] "programs that are tailored to the needs and wants of local groups" (e.g. Mattison, 1997, p. 183).
Individual Marketing	Each individual is on segment (e.g. Kotler, 2003; Pine, 1993).

Table 2.1: Levels of market segmentation

Kotler further distinguishes between (2.1a) Homogeneous-, (2.1b) Diffused- and (2.1c) Clustered preferences as a typical method for identification of common patterns (see Figure 2.1) (2001, p. 146).



(a) Homogeneous **(b)** Diffuse **(c)** Cluster

Figure 2.1: Market patterns

The general method of market segmentation is a three-step way to identify the segmentation patterns (2001, p.147):

1. Survey stage: This step is allocated to generate meaningful customer data and to gain a detailed customer picture. Relations between segmentation variables (see Section 2.4), product related attributes and customer-behaviors are key targets to focus on.

2. Analysis stage: A mathematical approach to identify different patterns or segments, which could be hidden in the generated customer data source. Approaches like factor analysis and cluster analysis are typically used in this step (e.g. Ulwick, 2005, p.71).

3. Profiling stage: The separated clusters are outlined by their individual profiles and labeled with a meaningful, representative name (e.g. Strouse, 2004, pp. 39-42).

After all relevant market segments are analyzed a company must distinguish between significant and garbage segments which could be the result of pure statistical reasons. Therefore Kotler (2001) has presented some arguments of an effective market segmentation result. Market segments should be:

- *Measurable:* Parameters as size, purchasing power and characteristics are quantitative.
- *Substantial:* The segments must be as big and profitable to enter in an effective economic point of view.
- *Accessible:* The segments must be reachable in an economic way.
- *Differentiable:* Different segments should respond to one marketing mix in a different way.
- *Actionable:* Each marketing mix can be formulated in an effective and a direct approach suitable for the individual segment.

Principle bases of Market Segmentation

Markets are generally divided into business and consumer domains caused through natural differences in habits, laws and regulations. Therefore segmentation variables have to be different in those areas to segment in a successfully way. Concerning consumer markets a separation between consumer characteristic (geographic, demographics, psychographics) and consumer response (behavior) take place to find a relationship between those two areas. For example, behavioral buying patterns (price, quality, design, brand, etc.) may be different in geographic - demographic - and psychographic segments. On the other hand, segmenting a business markets can be based on some variables of the consumer approach like geography, but additional variables are needed e.g. operating variables and personal characteristics of the purchasers themselves (2001).

- *Geographic* segmentation is a strategy where the market is grouped based on geographical units, such as nation, states, regions, countries, cities, or neighborhoods as well as population density and regional climate (e.g. Strouse, 2004, p. 105). For example, a marketing strategy of a sun care product might be different in an equatorial region compared to a colder, north region.

- *Demographic* segmentation is based on variables like age, income, material status, education, gender, race, etc. in a consumer market and number of employees, sales volume, years-in-business, etc. for a business market (Blattberg et al., 2008, p. 186). Kotler (2001) defines demographic variables as the most important one's for segmentation.

- *Psychographic:* segmentation is based on three groups: activities, interests and opinions (Plummer, 1974, pp. 33-37). For some individual elements of the groups see Table 2. In this context, Plummer (1974) is talking about lifestyle segmentation: "The basic premise of life style research is that the more you know and understand about your customers the more effectively you can communicate and market to them."

Activities	*Interests*	*Opinions*
Work	Family	Themselves
Hobbies	Home	Social issues
Social events	Job	Politics
Vacation	Community	Business
Entertainment	Recreation	Economics
Club membership	Fashion	Education
Community	Food	Products
Shopping	Media	Future
Sports	Achievements	Culture

Table 2.2: Elements of psychographic groups, Plummer (1974, p. 34)

.

- *Behavioral* segmentation focuses on the customer's doing or acting rather then what they are. Grouping of customers are based in the utilization of or response to a specific product or service. Kotler (2001, p. 151) defines the following behavioral variables and defines behavioral segmentation as one of the most often used starting point of any segmentation by marketers:

  - *Occasion:* Customers can be framed on base of the occasions where they develop a need, purchase a product or use a product.

- *Benefits:* What kind of benefits user or customer seeks can serve as a classification parameter to benefit a driven segmentation approach.
- *User status:* Hereby markets can be differentiated on a specific user status like a non -, churn -, potential -, a first time user and a regular user of a given product or service.
- *Usage rate:* The rate at which a product is can be used e.g. light, medium and heavy, serves as a segmentation basis. For example an Internet land line and the correspondent transfer capacity can be tailored for different usage rats.
- *Loyalty status:* The buyers can be separated by four brand- loyalty-levels which was presented by Brown (1953) and adapted by Kotler (2001):
- *Buyer-readiness stage:* People can be classified in an ascending order concerning the readiness to buy a given product, starting from an unaware one to a ready to buy one.
- *Attitude:* Peoples attitude can be explained in five different characteristics:

  1. enthusiastic,
  2. positive,
  3. indifferent,
  4. negative and
  5. hostile,

  which can serve as a grouping variable.

Today's segmentation approaches are not only based on one method, more over they are a combination of different, suitable methods to increase the predictions which are done for a target group. This is summarized in a "multi-attribute Segmentation" or geoclustering approach.

Data-Warehouse-Based Segmentation

Beside survey based segmentation there is yet another, very important method to improve targeting results: the segmentation process is based on the likelihood to buy a product or a service, which is determined by a statistical model. Thus, a predictive model is used to group customers based on a given question e.g. who is likely to buy a new product or which customer is churning from a company within

the next three month, with the intention to increase marketing efficiencies. This segmentation approach tries to maximize the payoff for any marketing activity concerning the four marketing P's (product, price, placement and promotion).

Target customer Base	500.000
Profit contribution	EUR 110
Cost	EUR 1
Response	1 %
Total	
Profit contribution	EUR 550.000
Cost	EUR 500.000
net Profit	EUR 50.000
ROI	10 %

Table 2.3: An example of a mass marketing approach

Suppose a company wants to direct market a new upgrade possibility for a given product which will contribute 110€ in profit. The target customer base is 500,000 in count. Therefore, a mass marketing approach with a respond rate of 1% would lead to a contribution profit of 550,000€ and the costs, supposing 1€ per direct mail, would lead in an overall cost for the whole campaign of 500,000€. The net profit would therefore be 50,000€, and an ROI (return on invest) in this case would be 10%. The example [4] is shown in Table 2.3. Note that this campaign is profitable but 99% of the marketing costs are waste.

This segmentation approach however, tries now to group the target customer with a more accuracy of responding. Therefore the target group is segmented in deciles and prioritized by their likelihood of responding. This is executed by a predictive modeling approach where each customer is selected based on a similarity to some variables and then grouped in the corresponded segment. An example of such a data-based segmentation result is shown in Table 2.4.

A predictive model like RFM, Neural Net, etc. is used to divide the target group in deciles with descending responding probabilities and with the same overall average respond rate of one 1% as assumed. In this example the first deciles of customers with a respond rate of 3% generates a profit of 115.000€ and therefore exceeds the approach of Table 2.3 with a profit of 50.000€. Furthermore it is clearly shown in Table 2.4 that the first five deciles are positive concerning net profit and the remainders reduce the cumulative profit significantly. Summing up the positive ones result in a net profit of 220.250€ and this is a gaining factor of four compared with the full targeting approach. However, this approach is only accurate if the level of prediction is good enough and there for a lot of precaution have to be set during the development of such a prediction model. But, as this example shows there are a lot of reasons for companies to dig into this method

[4] Example is adapted from Blattberg et al. (2008)

Decile	*#of prospects k*	*Response rate %*	*Profit k €*	*Cost k €*	*net-Profit k €*	*Cum. Profit k €*	*ROI %*
1	50	3.00	165.00	50	115.00	115.00	230
2	50	2.00	110.00	50	60.00	175.00	175
3	50	1.40	77.00	50	27.00	202.00	135
4	50	1.15	63.25	50	13.25	215.25	108
5	50	1.00	55.00	50	5.00	220.25	88
6	50	0.60	33.00	50	-17.00	203.25	68
7	50	0.40	22 .00	50	-28.00	175.25	50
8	50	0.30	16.50	50	-33.50	141.75	35
9	50	0.10	5.50	50	-44.50	97.25	22
10	50	0.05	2.75	50	-47.25	50.00	10
Total	500	1	550	500	50	–	10

Table 2.4: Predictive model of a mass market approach

to gain the advantage of such an approach.

Job-based Segmentation

Yet, another approach in segmenting customer is the so called "Jobs-To-Be-Done" method. Christensen & Anthony (2009, pp.1064) defines a Job as "the fundamental problem a customer needs to resolve in a given situation" and predict that this job-based-Segmentation approach will outperform traditional market segmentation approaches and their static nature due to the changing in buying behavior of customer compared to the change in e.g. their demographics. Ulwick (2005) has written a book about a new innovations based on jobs to be done. To illustrate the differences in job segmentation versus product segmentation there is a famous example of milkshake[5] segmentation presented by Christensen & Anthony (2009, pp.1065):

- *Product segmentation:* Define the market segment by product (milkshakes); then profiling the customers most likely to buy milkshakes; next a survey about the main "features" of a milkshake like, should the milkshake be chocolatier, cheaper, chunkier, etc.; This resulted in improvements of the product, but didn't increase the sales volume of milkshakes;
- *Job-based Segmentation:* Observation of customers during buying a milkshake and recognize what other circumstances like, at what time they buy

[5]The full story of "Hiring Milkshakes" presented by Clayton, can be seen at `http://www.youtube.com/watch?v=H3fGwsrXuZw`

one, whether they are alone or within a group, what other product they purchase, etc. occurred; Interviews with customers and asking them what they have done in the same situation, getting the same job done, but didn't bought a milkshake;

As a result of the interviews it was clear that most buyers were faced with a long, boring care drive and needed something in the hand to distract from the boring task. Yet another fact was that they would like to stave off hunger until lunch and that most of them were in a hurry. Once the main jobs of a product are understood then the attributes to change and the unrelated once become very clear. Moreover this approach fore run the real competitors because the main job-to-be-done can also be served with other products, like donuts and bagels, and not only competing chain's milkshakes. As a result this leads often to a much broader market as a product category-defined.

Andersen & Ritter (2008) present a similar approach of customer segmentation based on customer type, role and scene thereby trying to point out the different jobs a customer can capture. They summarize this with their "QUBEical segmentation" framework as shown in Figure 2.2.

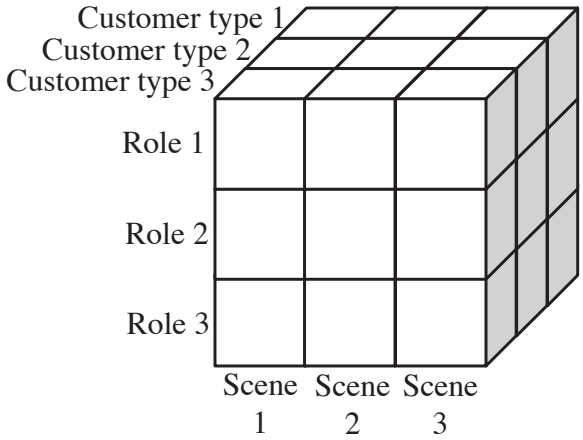


Figure 2.2: QUBEical segmentation;
Source: Andersen & Ritter (2008, p.77)

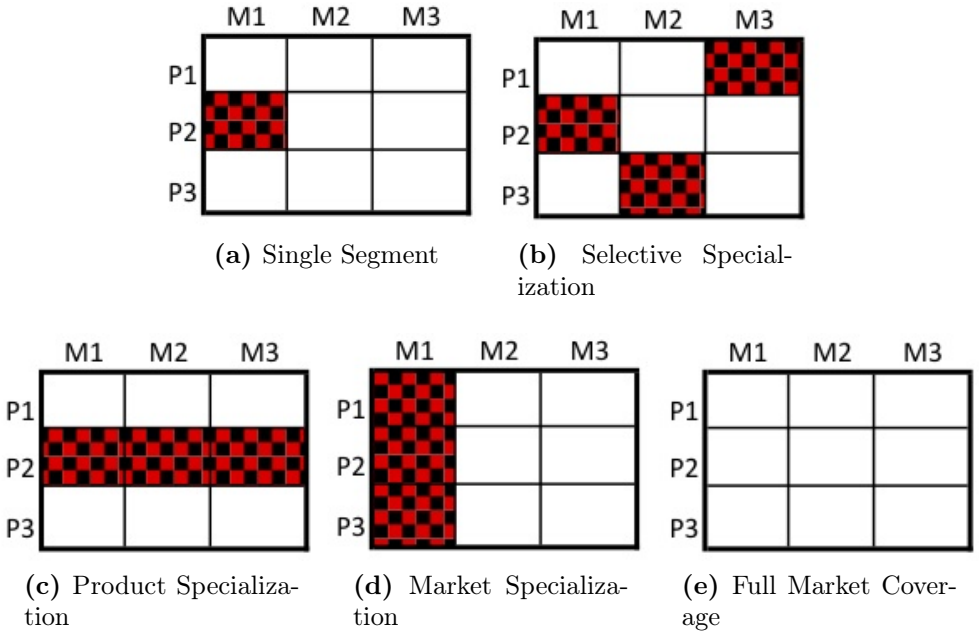
Targeting strategies

When the market segments are identified the next step is to evaluate the suitable one's, target and enter the most promising one. Thereby marketers have to look at two factors:

1. attractiveness and

2. company's objectives and resources (Kotler, 2001, p.155).

The company must evaluate the characteristics of the segment concerning general attractiveness such as cross average growth rate (CAGR), overall risk, size and profitability. Second the firm must decide whether investing in the segment is in line with the long term aims and its resources. After all the company can then select one of five different patterns of target market selection as presented in Figure 2.3a — 2.3e.



(a) Single Segment **(b)** Selective Specialization

(c) Product Specialization **(d)** Market Specialization **(e)** Full Market Coverage

Figure 2.3: Different pattern of market segment; Adapted from Kotler (2001, p.155);

- *Single-Segment Concentration (2.3a):* Concentrating on a single segment improves the understanding of the segment's needs and leverages the operating economics by focusing the production, distribution and promotion to a single segment. However this approach holds a higher risk due to the possibility of changing buying patterns.

- *Selective Specialization (2.3b):* Diversifying risk by selecting different segments is the advantage of selective specialization but on the same time there may be no synergies between the different segments and therefore increase the operating costs.

- *Product Specialization (2.3c):* Yet, another approach is to specialize on a single product for different segments. An example would be a software company, which sells project management software, specialized for some similar industries. Therefore a strong reputation can be build up but at the same time the risk of being replaced through a complete new technology or approach of doing the task increases.

- *Market Specialization (2.3d):* A company focuses on a single Market by serving different needs with different products. This customer group specialization can be the sources of new and needed products but the all over revenue is highly depended on the business wealth of the related market participants.

- *Full Market Coverage (2.3e):* Thereby a large company can go after the whole market and serve all different needs with different products. They can cover the market with either a differentiated (individual marketing mix for each segment) or undifferentiated (treating all customer the same) marketing approach. Examples are Coca-Cola, IBM and Siemens;

Chapter 3

The model – an approach to focus on the customer

Creating an added value through mash up of proven methods is the idea of Innomization.

Customization gets every year more and more important. Due to the increasing competition companies are asked to serve the needs of the customers more seriously and adequately. Customization is one core element to strive for this approach.

Innovation as such represents more than only technical driven ideas. An innovation is an idea, which is transferred into a product at the suitable time and serves the needs of the customers. The challenges are to identify the suitable time, to recognize the needs of the customers and to have the sustainable power to launch the product. Identification of suitable ideas needs the involvement of the customers. It is the critical task of the innovator, to ask the customers those questions, to enable them to give suitable answers. Average customers are used to think inside their known environment. Therefore it is important to ask the suitable (right) questions to enable the customers to transfer their needs. A structured procedure should enable to derive those needs.

There are different methods to work out the meaning behind those statements. The model Innomization includes three different approaches: the first one focuses on the behavior of the customer, which results in a segmentation of the similarities. The second one focuses on the identification of the needs of the customers. Finally, the third one summarizes all outcomes in the adaptability of the product to enable a suitable customization.

The model uses the different advantages of each procedure to gain the synergies for a holistic approach. The intelligent transfer of the collected information

is one core element for the success of the procedure.

3.1 Description of the model

The uniqueness of the model is the interaction between the collected information of different applied methods. Dependently on the available information and on the target of the development, suitable methods are applied. A company can have different targets for a development of a product. Following the different approaches a company can design a product to do the dedicated job better (Ulwick, 2005) as normal. A company can also design a product to get more jobs done for the same customer base. There is also the possibility to search for new customer segments, either with the existing better product or with a new, improved product, which serves more or other jobs.

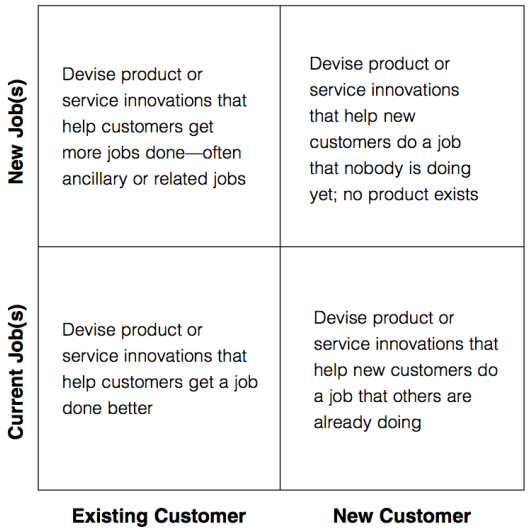


Figure 3.1: Growth strategy;
Source: Ulwick (2005, p.6)

The first and very important step of the Innomization model is the definition of the growth strategy (see Figure 3.1). This decision is related to the selection of the criteria for the product features.

The initial idea at the development of the model was a smart segmentation of the customers. Usually companies structure their customers due to demographical or revenue based criteria. The driver for a different approach was the finding that there are small companies, which behave more as large companies and vice versa. For example a consulting company, which consists of several employees, who travel around the world, has different communication behavior then a company, which mainly produces goods and do not use any mobile communication. Therefore not

only the development of products has to be closer to the behavior of the customers, furthermore the marketing messages have to be adopted. Both disciplines are related to the segmentation of the customers. In case that the segmentation represents also the intensity of the usage of features of a product, it enables the possibility to identify customer, who could resign the product. The screening of the behavior should be done on a regularly base. The change of the usage is the relevant factor to calculate the probability for the termination of a product. This information could be used to inform about additional features of the product to motivate the customer to use the product frequently. Next to the product view also the focus on the product road map should be done in combination with the segmentation. Companies can identify customers, who are not served very well and need to be satisfied with another product or additional feature.

Therefore a structured, more customer oriented, segmentation opens a window of opportunity to develop more suitable products. This leads directly to the customer needs. The different segments have different needs and expectations. Based on the structured more behavior-oriented segmentation, trends for customer need oriented product developments can be derived. Additionally there are several methods, which are able to derive the needs of the customers systematically. Examples for the considered methods are the Outcome Driven Innovation (ODI), which has been developed by the consultant company Strategyn[1], the Lead User[2] method but also systematically executed customer observations, structured by the consultant company IDEO[3]. Those methods enable the identification of the needs of the customer.

Outcome Driven Innovation offers a structured procedure for the idea generation of a suitable product. There are three principals, which describes this approach (Ulwick, 2005):

- Customers buy products and services to help them get jobs done
- Customers use a set of metrics (performance measures) to judge how well a job is getting done and how a product performs.
- These customer metrics make possible the systematic and predictable creation of breakthrough products and services.

The method starts with the identification of the strategy for the product development. Afterwards the jobs, outcomes and constraints are defined. Jobs are

[1]For more information see: `http://www.strategyn.com`.
[2]For more information see: `http://de.wikipedia.org/wiki/Lead_User`.
[3]For more information see: `http://www.ideo.com`.

the tasks of a product. A product can have one main job, which consist of several other jobs. Every job is measured based on its fulfillment, which is called the outcome of the job. One job should have about ten to fifteen outcomes. Additionally each product underlies several constraints, which have to be considered for the jobs and for the outcomes as well. The method uses an adopted procedure to define the suitable questions to identify jobs, outcomes and constraints of a product. Qualitative interviews with experts enable the identification of the jobs and outcomes. To know how important and satisfied the users with the outcomes are, a quantitative survey is needed.

The model Innomization includes these elements of Outcome Driven Innovation and additionally combines those with the gathered information in the previous customer segmentation part of the method. Compared with the standard procedure of ODI the advantages are obviously. The experts and the persons for the survey can be found quicker and more focused. The interview guide and the questions of the survey can be adopted for the segments easily. For each defined segment the expected outcomes and the constraints are identified clearly. Therefore, due to the combination of segmentation and elements of the method Outcome Driven Innovation a sharp picture of the customer can be derived. All information are visualized in a graph, which is called the opportunity map. Features, which are not important for the customer but their fulfillment is over-satisfied, open room for savings. Simultaneously, there are features, which are very important for the customer but the fulfillment is under satisfied, this provides room for improvements. All features are visualized inside a map, which is called the opportunity map. This map represents a visualization of the needs of the customers concerning the product features.

To customize products a lot of information is needed. The model Innomization collects all this relevant data and enables therefore the customization of the product. Mass customization means the possibility of the adoption of mass products to the needs of an individual. Based on the collected information the model Innomization continues with the adoptions for product customization. The range of product adaptability, which includes the different variations of the product, can be identified easier due to the known needs and behavior of the customers. Additionally, the approach for mass customization includes a configurator, which helps the customer to communicate their product requirements. This configurator could be a web-application, which gets the information out of the data warehouse. All relevant information about the customers is stored inside this data base. Therefore the data warehouse needs interfaces to the information of

segmentation and to the information coming from methods like ODI or Lead User. The third dimension of mass customization includes the ability to handle the internal processes. High process stability and the knowledge how internal adoptions have to be executed is a prerequisite for mass customization. One of the main ideas behind the model Innomization is a dynamic approach. Therefore process robustness has to be ensured for the integration of the model.

Dynamic, in this sense describes the continuous interaction of the involved methods. In contradiction to the execution of one method, Innomization has been developed to improve all involved data constantly. There are several loops to bring the collected information back to the segmentation to improve the developed customer cluster. Therefore a predication model for the future behavior can be derived and continuously improved.

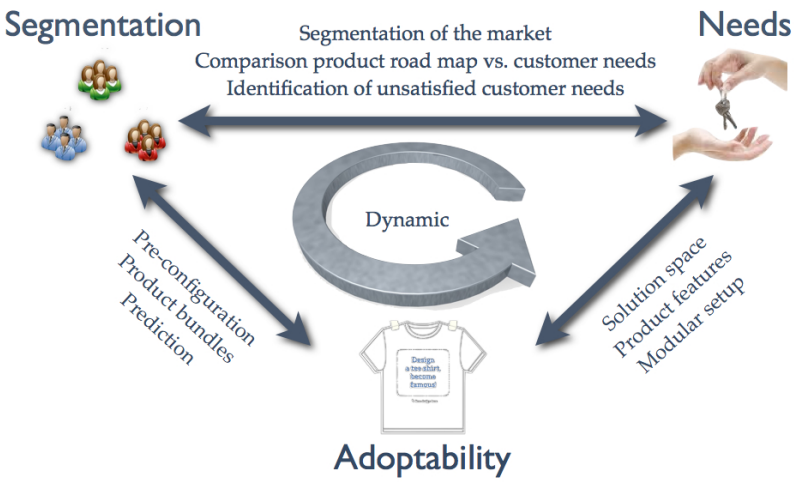


Figure 3.2: Model interaction

The figure 3.2 visualizes the exchange of the information between the elements of different approaches. As described above the dynamic in this model represents the interaction of the methods. Due to the close cooperation of those, the created information gets more relevant and valuable for each method.

Inside the model are several points, where product requirements can be derived. The segmentation of the product includes such points. After a customer oriented segmentation has been worked out, the actual product road map can be mapped with the customer behavior. Additionally the segmentation enables the analysis to identify potential customers for available products. The opportunity map, which is one core element of the Outcome Driven Innovation, provides also a list of requirements, which can be used immediately for further product

developments. Those quick wins can be used for product adoptions but also for short-term goals or even for promotion activities. To visualize the procedure more in detail the flow chart of the Innomization approach is shown in the Figure 3.3 on Page 37 where black lines represent the process flow inside the Innomization approach, while the red lines visualize an additional information flow inside the model.

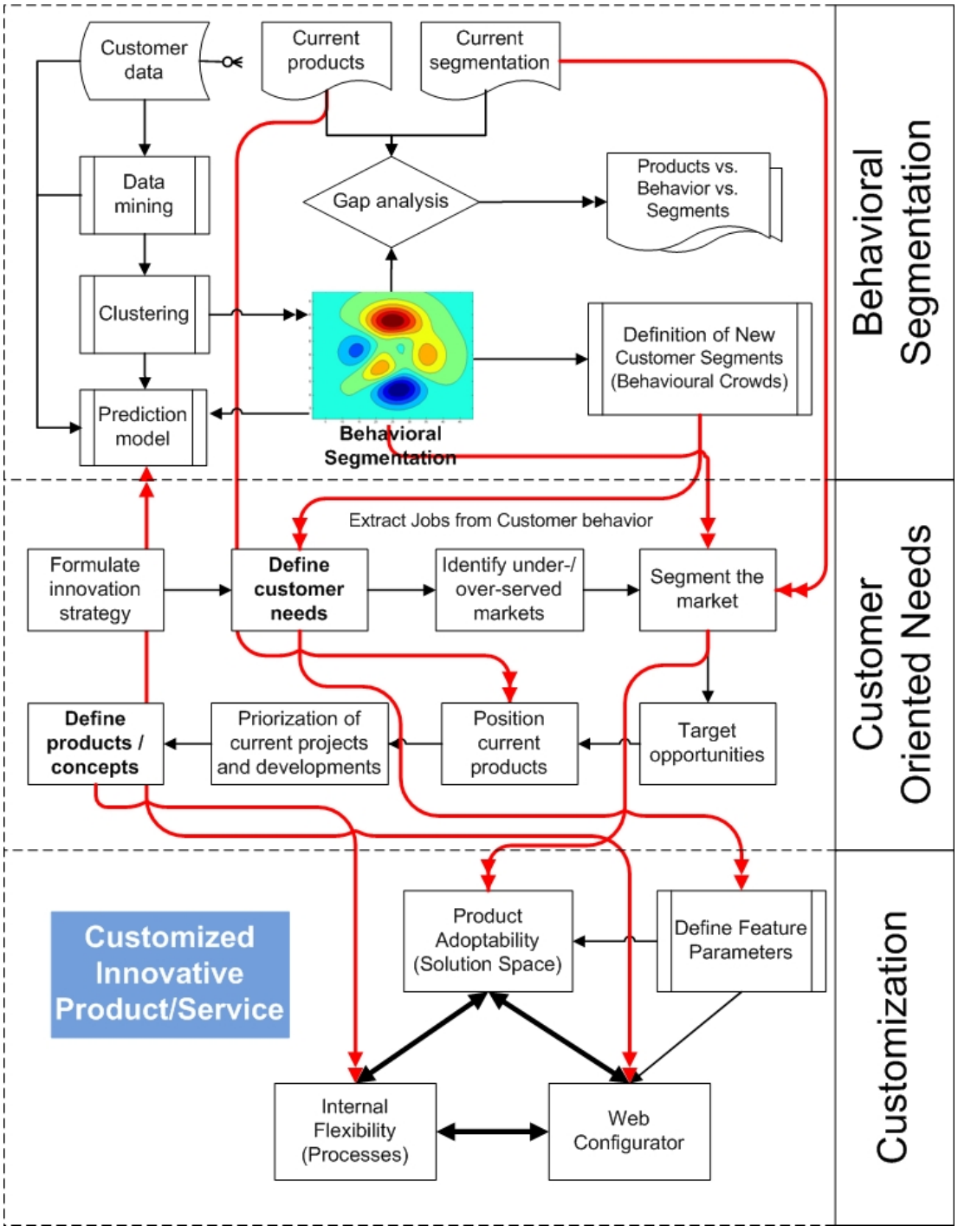


Figure 3.3: Innomization model

3.2 The relation between Innomization and a classical stage-gate-process

The target of the stage-gate-process is to reduce ideas step by step and search for the most promising idea, which will be realized as a product. An idea, which should pass a gate of the process, must have a defined quality. Therefore a main advantage of this procedure is the quality assurance. Usually meetings take place every few weeks. The trade off between the invested time of the participants and the response time to the idea owner has to be considered. Depending on the company and the branch the number of gates is different. Inside the telecommunication branch companies are used to have four to five gates, which include a review one year after the launch. As described previously, the product development process, handled inside a stage-gate-procedure, takes six months to one year for telecommunication products.

The Innomization model focuses more on the first few phases in the product development. The idea of the model is to offer more room for creativity at the beginning of the product development and search more at the initial phase for ideas, which will meet the customer expectations more suitably. Compared to a classical stage-gate-process the Innomization model creates ideas, which are more promising and therefore the model should reduce the number of ideas, which will be terminated inside the stage gate procedure. Once an idea is transferred into a concrete product description the development of the product should run quiet fast. Currently inside the telecommunication branch ideas for products are discussed with all involved departments from the initial idea creation. Therefore the evaluation but also the definition of the idea takes a lot of time. Once an idea is dropped out, a lot of valuable human resources are wasted. The model Innomization directly focuses on the improvement of those two parameters:

- the quality of the idea
- the speed of idea creation

Quality of idea means that there is more customer orientation at the idea creation step. Speed of idea creation comes from a concrete product description, which can be deployed faster. Prerequisite for a faster deployment is the interface between the product development and the product deployment. For example, currently inside the telecommunication branch, most of the companies do not distinguish between the development and the deployment, both is handled inside one procedure. Only the ideas, which should be realized in a product, should

be considered for the deployment. The less numbers of idea will accelerate the deployment procedure. Following the innovation funnel of the stage-gate-process the model Innomization can be described through an "Innovation Reactor" (Järrehult, 2009). The tasks before gate 3, which are visualized in Figure 3.4, can be

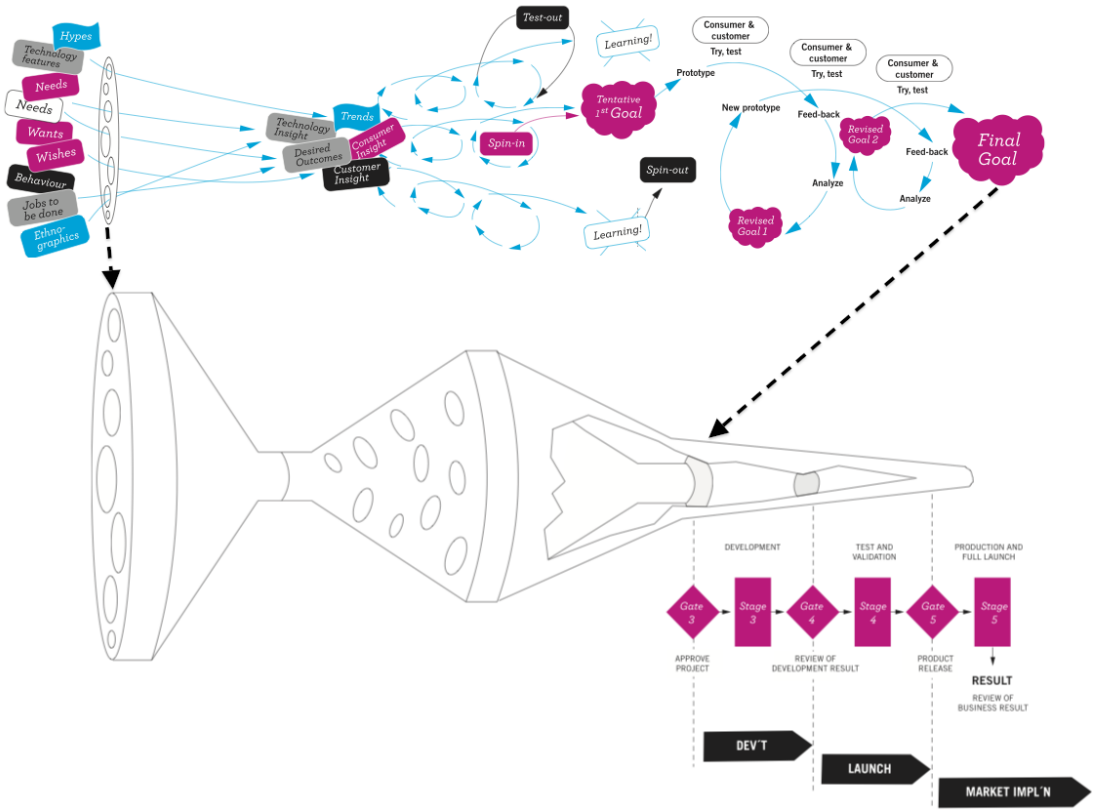


Figure 3.4: Innovation reactor; Adapted from: Järrehult (2009, p.11)

handled more flexible. Those tasks after gate 3 concern the deployment and are structured comprehensively.

3.3 Analysis of the costs of the model

The costs of the model have to be distinguished between the setup costs to introduce the model and between the running costs. The model involves three different methods, which have to be introduced but also harmonized. This means that the methods have to be adopted to use the synergies resulting from the information exchange. Following Prahalad & Krishnan (2008) there are three different main drivers for costs of an innovation model inside a company:

- The costs for Information Communication Technology (ICT): Those costs include all expenditures for IT like computer, server but also for communi-

cation technology.

- The costs for business processes: Those costs include the internal costs to setup and to integrate new products. Additionally also those costs to adopt products due to the needs of the customers.

- The cost for analytics: Here are all expenditures included for insights into the data, which are needed to analyze and to interpret the information. This information is the base for further activities.

All three described elements are relevant for the Innomization model. Depending on the available structure, the initial setup expenditures can be variously and high.

The most challenging part is the adoption of the business processes. The idea of Innomization is a continuous self-learning procedure. Once the system is up and running the procedure should be able to run automatically. To enable this, a holistic analysis of the actual process has to be executed to derive the needed adoptions.

The expenditures for analytics are the crucial factor for the success of Innomization. The huge amount of collected information must be analyzed to know how to proceed. Also those expenditures, for a sustainable analyzing instrument, are at the beginning high but should be reduced during the running procedure.

Summarized the costs for Innomization are high at the setup. Compared with a classical stage-gate-process the costs for the development of a suitable product is lower due the synergies between the methods. Additionally the stage-gate-process produces a lot of ideas, which are terminated after an investment in evaluation. The model Innomization is designed to run more efficiently due to the main target to design customer oriented products. The amount of terminated ideas is much smaller and therefore the procedure is able to run more efficiently.

3.4 SWOT analysis

A SWOT-analysis (see Table 3.1) provides a better insight into the model Innomization. The strength and weaknesses of the model as internal factors are compared with the external factors opportunities and threats for Innomization.

The main strength of Innomization is its customer centric approach. Each element of the model puts the customer in the focus of all considerations. The procedure enables the development of products, which have a higher probability

SWOT		Internal Analysis	
		Strength	**Weaknesses**
External Analysis	**Opportunities**	Customer centricity » Higher probability for suitable products	High involvement of all participating employees » Training of all employees needed
		Synergies through an intelligent transfer of gathered information » Higher efficiency should lead to cost reduction	Not whole procedure is executed » Definition of several early exits for quick wins
		Reduction of number of ideas, which are terminated in the process » Development time should be reduced	
	Threads	Organizational changes needed for the integration of the model » Embed available competences into the procedure	High complexity » IT support necessary
			High set up costs to run the whole procedure » Introduction of system can be done step by step

Table 3.1: SWOT-analyses of Innomization

to satisfy the needs of the customers. This opportunity derives through the customer centricity. Additionally, the strength of the model is the synergy of the combination of different innovation methods. This leads to another opportunity. All gathered information increases the probability to develop a more suitable product for the customer. The third strength of the model is its procedure to reduce the number of general ideas, which are terminated during the procedure. The opportunity based on this strength is the reduction of time for the development of new products.

A weakness of the model is the high involvement of several employees. Those participants need a common understanding to run the procedure. Simultaneously this opens also an opportunity for the company to educate the employees for innovation methods and to increase the common knowledge. Another weakness of Innomization is the time to execute the whole procedure. Therefore several exit points have to be defined, which provides information for a product development. The early exit enables an opportunity to run a fast track through the Innomization

model.

Organizational changes are needed to integrate the model. Such changes always lead to threats inside a company. Not all employees appreciate any modifications in their tasks. Therefore the concerns of the participants have to be considered as early as possible. The strength of Innomization is the involvement of various competences. Therefore employees, who have high concerns against Innomization, have to be embedded into the procedure carefully.

A weakness of Innomization is its high complexity inside the procedure. To remove this weakness IT support is needed. The additional necessary IT infrastructure could lead to threats at the employees. Another weakness of the model is the high set up cost to run the whole procedure. This high upfront investment threats the decision makers. This weakness can be terminated through a modular introduction.

Chapter 4

Research approach

4.1 About the survey

The product development process is handled differently inside companies and similarities can be monitored inside branches. A product development process can be measured on several criteria. Examples for those criteria are:

- The time it takes to develop a new product through passing this process.
- The quality of the new developed products, which are the output of the process. In this case, quality does not only mean the quality of the manufacturing, furthermore it includes the level of satisfaction for the customer.
- The investment of resources to execute the process. Resources in this case includes human power but also infrastructure like IT systems.
- The complexity of the process, which describes the difficulties to execute the process.
- The financial investments, which have to be paid upfront to enable the process but also the cost for continuous running of the process.
- The possibilities to adopt the standard process. Possible adoptions of the standard process could be an exit of the process including a structured procedure to create an added value for the product development approach.

Companies, which have a better product development process, which means in respect to some of the previous factors, a short process time and a higher quality for customers, have a deciding advantage for competitive advantages. Therefore a comprehensible conclusion is the question concerning the core elements, which

distinguishes a successful product development process from a less successful one. To identify those core elements to have a faster and more customer-oriented product development process is one target of the evaluation. Another target of the evaluation is the investigation of the developed model Innomization. As described previously the authors have developed a model, which should improve the outcome of the innovation process through combining different well-known procedures.

The master thesis investigates the interaction of the following, involved methods:

- Customer behavior oriented segmentation to identify groups of customer with similar needs and structure the development process to satisfy the needs of the defined customer segments.
- Methods with a customer need oriented approach as Lead User, Outcome Driven Innovation or Customer Observation. Those methods enable the identification of the needs of the customers.
- Customization of products to satisfy different customer needs through product variations. Customers should have the possibility to adopt a product due to their expectations in their environment.

As described in Chapter 2 all involved methods have their strength but also their weaknesses. The developed model combines the strength of each method and creates therefore a more valuable outcome for the customer. To evaluate this assumption and the developed model the authors have chosen a three steps approach.

The first one includes a web-based survey to evaluate the current status of the innovation approach inside a company. The second one consists of workshops with experts in product development and innovation to present the participants the developed model and to discuss with them the opportunities and hurdles of the integration of such a model. The third step of the evaluation includes personal interviews with experts to delve into the broad issue of product development. All personal interviews and workshops are executed with persons, who are working inside the telecommunication branch. Persons in different branches also filled out the web-survey.

The reason of the selection of the telecommunication branch is mainly driven by the personal interest of the authors but also by the huge challenges inside this extraordinary branch.

Product developments inside the telecommunication branch take usually from six months up to one year. Compared to other branches the complexity of products is quiet high. Usually a high level of the product quality is expected at the launch date. Each introduced product into the market has influence into all departments inside the telecommunication company. The IT infrastructure is very complex, changes inside this system needs a lot of resources and time. This influences the innovation process as well. The long period to launch a new product is mainly caused by the high synchronization work between all involved departments and employees. Another relevant factor for the decision to run the evaluation mainly in the telecommunication branch is its extraordinary eco-system. Companies often cooperate with their vendors to launch a new product. Not only delivers the vendor some core elements of a product furthermore the cooperation continues with a revenue share model of all generated revenue streams from the product. Those observations in combination with the network of the authors caused the decision to choose the telecommunication branch as a reference branch for the evaluation of the model.

To search for experts in product development procedures, the authors have evaluated their personal networks and selected experts, who have been invited to fill out the questionnaire. The different backgrounds of the two authors enabled to assemble an inhomogeneous group of interviewees. Additionally a platform for innovation management in Austria, which members are various companies in different branches supported the authors to reach other branches as well. The created web-survey was sent out to all those members, independently of the branch and the size of the company.

4.2 The development of the questionnaire for the web-survey

The web-survey has the main advantage to investigate current established procedures inside a company. The participants were asked to fill out the web-based survey, which consists of questions concerning the current innovation process. As described in the literature a web-survey can be applied to capture current status of established procedures (see Bortz & Döring, 2003, p. 297). Participants can transfer their opinions and their procedures easily. The disadvantages of such procedures are the possibility of clear formulation of the questions and the non-opportunity for the interviewer to ask any additional question in case that the answer was not clear enough. The main strength of the web-based survey is the

structured procedure to analyses the data in case that all possible answers were predefined. Additionally other advantages of this procedure are the standardized answers and especially the possibility to send out the questionnaire to experts, who can fill out the survey due to their time availability.

The developed questions are formulated as much independently as possible. This means that the questions have to be understandable independently whether a person explains the answers during the execution of the web-survey or the expert himself is filling out the web based form. Due to the focus on the telecommunication branch some questions and predefined possibilities for answers have its source in the mindset and in the process landscape of a telecommunication structure. Nevertheless the authors strove for a structure of the web-based survey to cover as much as possible answers independently of the business of the interviewee.

4.2.1 The questionnaire setup

The questionnaire for the web-survey consists of two main parts. The first part, which represents most of the questionnaire, includes questions about the actual situation of the innovation process in the company. The second part of the questionnaire includes questions about the branch and the role of the interviewee. That statistical information is needed to work out comparison between different branches but also between the views of different departments inside a company.

The target of the first section is the identification of the strengths and weaknesses of the established procedure. The questionnaire starts with the collection of information about the segmentation of customers. This includes questions about the data, which are collected, the procedure, how the information is collected and also about the clustering of the gathered information. This questions are used to receive an overview how the company structure the customer information. Afterwards the survey continues with the established procedure of idea generation and the management of created ideas. This includes questions about the methodology to generate ideas and also about the established innovation process. The next phase focuses on relevant information to establish a mass customization approach. Therefore questions concerning the product adaptability and about the availability of a web-based application to configure products are asked. The first section ends with a question concerning the strengths and weaknesses of the established procedure from the point of view of the interviewee.

The second section includes questions about the general information of the interviewee and the company he is working for. This information enables the

comparison between companies in different branches. As described previously the focus of the proof of the model is done inside the telecommunication branch, nevertheless the innovation procedures of companies in other branches are also relevant to work out, if the model Innomization is suitable for those. Additionally, based on the remarks of the interviewees, a comparison of the point of view on the innovation process of persons in different departments is worked out. The information, how these persons participate in the innovation process, is relevant to work out, which department or role participates in the innovation process.

4.2.2 The importance & satisfaction of questions

Almost all questions in this first section have an additional paragraph in the questionnaire, which asks the interviewee to score the importance and the satisfaction of the described issue in this question. In case that the interviewee states that the information is very important (5) for him and he is also very satisfied (5) with the current procedure gives an indicator that no improvement is needed. But otherwise, in case that the collection of the information is very important (5) but the current established procedure is not satisfying (1) his expectations provides an indicator for improvements. Figure 4.1 is an example to visualize the idea behind this additional paragraph in each question.

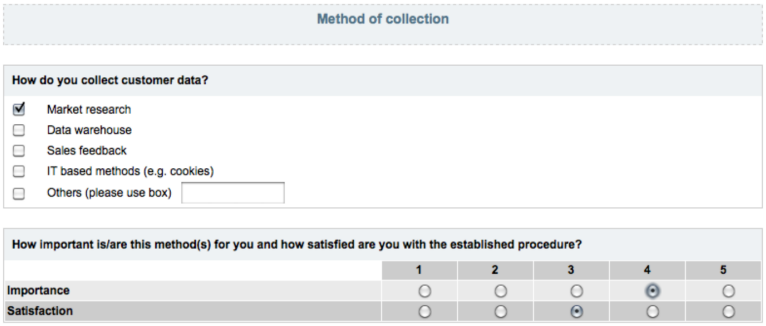


Figure 4.1: Example of a question

First, the interviewee has to answer the question by using one of the suggested possibilities. In the previous example the interviewee has chosen answer one. Second, there is the added paragraph, which asks to score the importance and the satisfaction of the collected information. The example shows a value four for the importance and a value three for the satisfaction. In this case there is an indicator that the collected information is important for the interviewee but it also indicates that the established procedure has room for improvements. The authors search for areas, which are important for the interviewee but not satisfied

completely. Those areas open an opportunity for improvements, which could be targeted by the developed model. Additionally, evaluated areas, which are over satisfied but not important for the interviewee, opens room for savings.

All values for satisfaction and improvement are collected in a diagram, which is called the landscape for opportunity. An example for such a landscape is visualized in the Figure 4.2 . All figures inside the Figure are created by the authors randomized and do not represent any actual figures of the survey. Additionnally the figures are calculated figures, which means that are average values of all assigned scores of the participated interviewees are visualized. The Figure

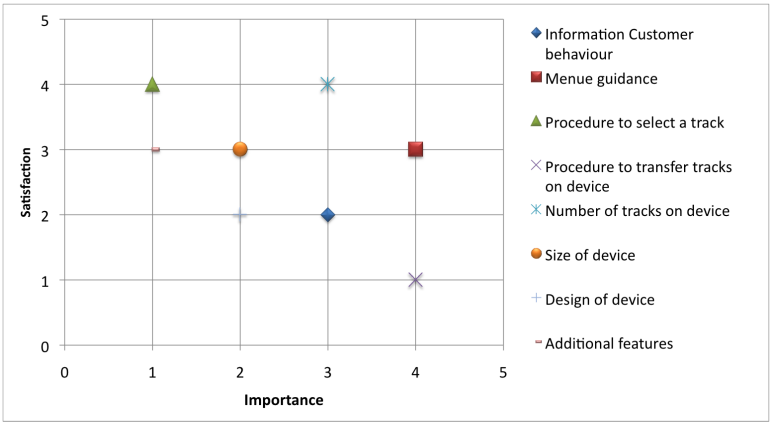


Figure 4.2: Landscape of different outcomes

4.2 illustrates that the involvement of customer is very important for the average of the interviewees but they are not satisfied with the current established procedure. This dissatisfaction opens a window for opportunity for improvements. Additionally the graphics demonstrates also that the method to cluster is not very important for the participants but simultaneously they are over satisfied with the current procedure. Comparable to the room of improvement, this over satisfaction opens the window for cost reduction. This results provides a trend or an indicator to do the data clustering more efficiently caused by the low importance and the over satisfaction.

4.3 The design of the workshops

The authors have developed a model for a combination of an innovation process and customization approach. The workshop focuses on the proof of the model. Developed models are not easy to evaluate with a web-based survey (see Bortz & Döring, 2003, p.309). The participants have to consider a model, which is actually not available. They need assistance to understand the model step by step.

Therefore the authors made the decision to execute workshops with experts to present them the model and to discuss the strengths and weaknesses but also the applicability of the developed procedure. Two workshops with different persons from different departments are executed. Each workshop takes at least two hours. In each workshop participants, from different departments should grant the diversity of the outcome and enable a fruitful discussion. To execute the workshop a guideline, which leads the moderator, is developed by the authors. Several steps are necessary to create the guideline to evaluate the Innomization model. The development of the guideline for the workshop is a critical success factor. The authors disassembled the developed Innomization model into the main elements. The participants had to understand each of the elements in order to be able to evaluate the model. The guideline should lead the participants through the elements and conclude all collected information into the developed model. Therefore the target of the guideline was the structured procedure to enable the participants the understanding of the model in all core elements. The developed model consists of several related processes including the core elements for:

- Segmentation of the customers based on their behavior.
- Methods for the identification of the customer needs.
- Possibility for the customer to adopt the product concerning his own needs and own behavior.

Therefore, there are three different procedures, which have to be understood by the participants. Not only are the participants differently involved in one or more of the methods but furthermore they have different knowledge about each of the methods. Theoretical background to each method is needed but examples for applications of the methods enables the participants an efficient way to understand the idea behind each method.

The guideline for the workshops starts therefore with an overview about the involved methods. The participants should be able to understand the main picture. Open questions should motivate the participants to think about the usage of a model, which combines the partly established procedures.

The need for the usage of an improved product development process should also be demonstrated through presenting a part of the results of the web-survey. Only the inputs of the interviewees, who are working in the telecommunication branch, are collected and worked out. The opportunity map, which included the satisfaction and the importance for the asked elements in the web-survey, is presented to the participants of the workshop. Therefore, each workshop member

is able to interpret the results by himself and conclude elements, which have to be improved.

The guideline continues with the presentation of the relevant methods by explaining different examples. The authors try to reduce the needed theoretical background as much as possible. Methods are explained through applications and use cases. To show different environment for the application of the methods, the presented examples come from different branches. The examples to describe the involved methods are:

- Customer segmentation: The segmentation of a restaurant, which sells milkshakes to its customers. Due to a not suitable segmentation it was not possible to increase the sales of the milkshake. After an adoption of the segmentation, due to the needs of the customers, the restaurant was able to increase their sales dramatically. The case is described by Prof. Clayton Christensen[1].

- Customer needs: For example the method Lead User is presented through products, which have been developed through this method. Examples are the mountain bike or the shower-bath combination called Twinliner. A switch board, which has been developed by Hager, is presented to the participants, to reflect that a seemingly standard product, can by improved through the method Outcome Driven Innovation.

- Customization: Examples like myMuesli[2], Threadless[3] or Lego[4] are presented to visualize that customization has been adopted on different products, which are mainly known by the participants.

Additionally a briefly overview about the procedure to run the method is given to the participants. After each presentation of the method the participants of the workshop are asked to discuss if the method can be applied at the company. Additionally the question concerning the needed information and concerning the opportunities and hurdles of an integration is discussed.

The final part of the guideline of the workshop is an overview about the whole Innomizatio model. The participants get an impression about the relations between all elements of the procedure. Due to the different backgrounds, each participant has other experiences. The workshop enables a discussion and knowledge sharing. The target of the workshop is not to come to a common decision,

[1]For more information see: `http://www.youtube.com/watch?v=H3fGwsrXuZw`.
[2]For more information see: `http://www.mymuesli.com/`.
[3]For more information see: `http://www.threadless.com/`.
[4]For more information see: `http://designbyme.lego.com/en-us/default.aspx/`.

whether the model Innomization should be integrated or not, it is the creation of a common understanding and a fruitful discussion about the opportunities and threats of the model.

This leads to the participants of the workshops. The authors searched for employees, who are located in different departments and have different experiences. The selected persons work for:

- Product Management: Persons, who are usually responsible for the development of new products.
- Technical Department: Persons, who develop and realize the products.
- Customer Loyalty Management: Persons, who have deep insights into the established segmentation procedure.
- Web-Portal: Persons, who have the link to the customer through one of the main communication channels.
- Business Development: Persons, who are experienced to create and established new businesses.
- Customer Service: Persons, who receive the complaints of the customers and who are usually the single point of contact for the customers.
- Market Research: Persons, who have an overview about the current developments in the market.
- User Experience: Persons, who do the customization of some products through user experience workshops.
- Marketing Communication: Persons, who are responsible for the communication of the products.

The previous described persons have different hierarchy levels inside and also a different belonging to the company. Therefore a high diversity, which is crucial for the success of the workshop, is granted.

4.4 The design of the interview guide

To develop the guideline for the personal interviews, similar considerations to the development of the guideline for the workshop, are reflected.

The persons, who are interviewed, are working for departments, which are described above. The difference between a workshop and a personal interview is obvious. In a workshop the participants can discuss several issues inside the group. The moderator has the job to control the discussion and to ensure that all needed information is available. In contradiction during a personal interview the interviewer has the possibility to ask some question more in detail in case that any statement was not understood clearly.

Most of the persons are asked to choose, whether they want to join a workshop or prefer to share their experience and knowledge based on a personal interview.

The interview guideline is almost similar to the workshop guideline. The procedure, of the interview depends on the experience of the interviewee. Some have deep insights into one of the involved methods. Therefore the explanation and description is quiet short.

The outcomes of the interviews are comparable to those of the workshop. In the Chapter 5 the results of the workshop and of the personal interviews are described together.

Chapter 5

Research results

The research question has been challenged through a quantitative and qualitative research approach with the results presented in this chapter. The first part, section 5.1, describes the quantitative results and the second part, 5.2, which explains the qualitative results.

5.1 Online survey results

The survey has been released on May 31, 2010 and was online until June 30, 2010. In this period there were a total of sixty-eight (n=68) valid, full itemize questionnaires returned. The survey itself can bee seen in Appendix A on page 86. The main questions, which drive the importance and satisfaction approach, are listed in Table 5.1

Nr.	Question
Q01	Which information do you gather about your customers?
Q02	How do you collect customer data?
Q03	What kind of statistical methods do you use for your segmentation?
Q04	How often do you update your segmentation results?
Q05	How do you support the creation of ideas in your company?
Q06	How do you involve the customers into the idea evaluation procedure?
Q07	How is the innovation process structured within your company?
Q08	Which innovation methods are established in the company?
Q09	How much are you able to adopt your products due to the needs of customers?
Q12[a]	Which possibilities do your customers have in adopting a product with a web configurator?

Table 5.1: Main survey questions

[a]Note that Q10 & Q11 are add-on questions for Yes or No answers and therefore excluded from this summary table.

Concerning the importance and satisfaction questions the valuation scheme is shown in Figure 5.1.

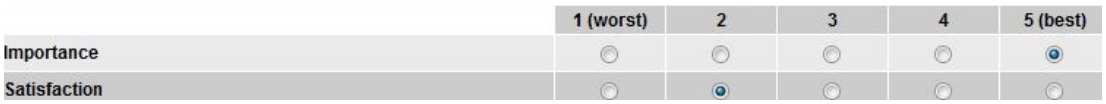


Figure 5.1: Valuation scheme

5.1.1 General related questions

One part of the questionnaire has its focus on industry, competition and company related questions like employees related, departments involved in the innovation process, etc. and gives an overview of the survey participant themselves.

- **Industry related questions:**
  - ***Which industry do you belong to?*** More then a third of the participants belong to the telecommunication industry and hence the focus of the Innomization process on this industry has found its critical examiner. However the same amount is distributed over a wide range of different industries, like health care, manufacturing, security etc. and this will allow a general valuation of the process in question (see Graph A.1 on Page 86).

    Finding 5.1: *The industry distribution is relatively homogeneous however, some industries are very related like telecommunication and computer industry and therefore the Innomization survey has found its focus in information and telecommunication technology (ICT) related industries.*

  - ***How competitive is your industry?*** Two third are working in a highly competitive market and a fifth in a competitive environment. Only two percent see the market as slightly competition (see Graph A.2 on Page 86).

    Finding 5.2: *The majority of the sample is confronted with very high competition and search therefore for competitive advantages to overcome the pressure of competition.*

- **Company related questions**

  - ***Numbers of employees?*** Roughly one half of the participants are belonging to a company which is larger then a thousand employees but there are as well small and medium sized companies (SME), approximately twenty percent, with less then fifty employees (see Graph A.3 on Page 86).

    Finding 5.3: *A bigger part of the companies deals with lots of employees and has therefore special purposes for an integrated innovation process.*

  - ***Which departments are currently involved in the product development process?*** Overall there is an uniform distribution over the main business units, like marketing, R&D, customer service, sales, etc. with approximately 14-20% (see Graph A.4 on Page 86).

    Finding 5.4: *Due to the fact that mostly all relevant business units are currently involved in the innovation process the Innomization approach has to include all different needs and expectation from the different departments to be successful.*

  - ***On average, how long does it take to launch a new product [in months]?*** The development of new products takes more than six month for around 50% of the participants. A fifth is taking less then six month for the time duration of new product development (see Graph A.5 on Page 87).

    Finding 5.5: *Complexity of the product might be a reason for the time duration of product developments nevertheless coping with fast and long product launching times is a necessity for an overall approach.*

  - ***Which department do you belong to?*** The distribution of the participants' belonging departments is driven by the marketing unit (40%) and then roughly 10% for each other involved unit (see Graph A.6 on Page 87).

    Finding 5.6: *With the assumption of a normal distribution of the participants' departments during the survey invitation there could be a general reason of higher marketing interest in the innovation process itself.*

– ***In which role do you currently participate to the innovation process?*** People bringing in ideas and those with a high innovation process involvement are balanced around 30%. Innovation process manger participate with 16% (see Graph A.7 on Page 87).

Finding 5.7: *Focusing only on the idea generation contributors is by fare not enough for an Innomization process. Moreover there should be a focus on every type of involved layer, thus a useful end-to-end process can exist.*

5.1.2 Information collection

- **Which information do you gather about your customers?** The information collection is roughly uniformly distributed, however the collection is based on the differentiation between business and residential customers. The single exception builds the psychographical data (see Appendix 2.4) where only five percent use that kind of data. 55 % are valuing the importance of customer data collection as very important (5) whereas 40 % are medium satisfied (3) with the current customer data collection (see Graph A.8 & Graph A.9 on Page 88).

  Finding 5.8: *Companies do select different customer data based on residential and business differentiation and are aware of the importance, however there is a lot of space to improve the overall satisfaction with data collection.*

- **How do you collect customer data?** Data collection itself is mainly executed with market surveys, data ware houses and sales feedbacks. IT based methods like cookies and forum analysis are rarely used for collecting customer data. 90 % values the importance of the method, how the data collection happens, as very important (4-5) and with a medium satisfaction (2-3) (see Graph A.10 & Graph A.11 on Page 88).

  Finding 5.9: *Data collection is still based on direct method e.g. defining a question, table in a data warehouse and then filled up with data. Whereas indirect method e.g. collecting everything and then analyzing the data, is still far behind as a general procedure. Moreover it seems that the satisfaction with the selected method is not very high.*

- **Do you segment your customers?** 83 % of the participants do a kind of customer segmentation whereas there are some around who don't do any segmentation at all (9%)(see Graph A.31 on Page 93).

  Finding 5.10: *Segmentation is a must have for most companies.*

  - ***If No:*** No further question were asked.
  - ***If Yes:***
    * *What kind of statistical methods do you use for your segmentation?* The most used statistical method for segmentation is a clustering approach (35%) followed by a recency, frequency and monetary method. Standard regression and decision trees are used as well, however rarely. There are some people, who do not know which statistical tools their companies use (10%). Importance of the method is at the upper side (4-5) whereas the satisfaction has a medium level (3-4) (see Graph A.12 & Graph A.13 on Page 89).

      Finding 5.11: *Clustering is the most used statistical approach for segmentation. Artificial methods like neuronal network, machine learning hasn't found their user. The method itself seems to be very important however at the same time satisfaction isn't quite high. Recency, Frequency and Monetary Value (RFM) is also relatively high and this might be the result of a misinterpretation between the model RFM and the single used parameters.*

    * *How often do you update your segmentation results?* The mean of companies renews their segmentation results once a year. The renewal is very important (4-5) and the satisfaction is in the mid range (3) (see Graph A.14 & Graph A.15 on Page 89).

      Finding 5.12: *The average of one year time period of segmentation renewal shows that companies would like to have a shorter period and that they are far away from a dynamical segmentation approach.*

5.1.3 Idea generation & evaluation

- **How do you support the creation of ideas in your company?** The most ideas are generated during discussions with the customers and in parallel during workshops and trainings. Fairs and congresses are as well a

source of new ideas. The importance of the supporting of idea creation is very high (5) and the corresponded satisfaction is on a medium level (3-4) (see Graph A.16 & Graph A.17 on Page 90).

Finding 5.13: *Customer themselves are used by companies for idea generation process in a great portion.*

- **How do you involve the customers into the idea evaluation procedure?** Customer involvement in the evaluation of ideas is mostly unstructured or implemented with customer focus groups. The importance of the customer involvement seems to be in the upper range (4-5) but the satisfaction is around 40% on the medium level (3) (see Graph A.18 & Graph A.19 on Page 90).

  Finding 5.14: *Customer involvement is still an unstructured process and therefore new innovation methods are mostly unused. However customer focus groups are an established method to get customers involvement.*

5.1.4 Innovation process related questions

- **How is the innovation process structured within your company?** One third have a dedicated stage-gate approach for their internal innovation process. Roughly the same amount uses ordinary project approaches to structure the innovation process. Only 13% are using dedicated innovation methods. The importance of the method itself is medium to high (4) whereas the satisfaction is medium (3) (see Graph A.21 & Graph A.20 on Page 91).

  Finding 5.15: *Traditional approaches are still dominating the landscape of innovation methods although the overall satisfaction is not very high.*

- **Which innovation methods are established in the company?** All listed methods are uniformly distributed (10%) only customer involvement exceeds the mean. It seems that the importance is not very high (4) and closely followed by the satisfaction variable (3) (see Graph A.22 & Graph A.23 on Page 91).

  Finding 5.16: *The method itself seems to play a minor rule in the innovation process. This is also shown in the importance of the topic, which is not very high, however focus group preforms as an outlier.*

5.1.5 Product customization

- **How much are you able to adopt your products due to the needs of customers?** Adaptability of products is highly related to the customer requirements (40%) and project base related (20%). Only 10% have one or more products, which can be adopted individually. The adaptability seems to be very important (5) and have a correspondent medium satisfaction (3-4) (see Graph A.24 & Graph A.25 on Page 92)

  Finding 5.17: *Although the importance of product customization is evident, few are supporting a standardized possibility to customize their products. It seems that product customization is more ore less a order to build capability.*

- **Web Configurator related questions**
  - ***Do you have a web based application which enables the customer to adopt your products?*** A fifth of the participants do offer some kind of web based configurator. The majority (72%) do not offer a web configurator (see Graph A.30 on Page 93).
    - *If No:*
      - *Can you imagine to offer a web-based application as a product configurator?* From those who do not currently offer a web based configurator 12% could fully implement one, 48% could implement some kind of configurator but with limitation and the rest (40%) do not think to offer one (see Graph A.28 on Page 93).

        Finding 5.18: *There is a large portion that think about the possibility to offer a web-based configurator.*

      - *Importance of a web based application?* The importance of a web based configurator is diverse: 33% slightly, 29% medium and 22% much important (see Graph A.29 on Page 93). ref-graph:11).

        Finding 5.19: *It seems that the advantage of a web-based configurator is highly divergent in its perception.*

* *If Yes:*
  - *Which possibilities do your customers have in adopting a product with a web configurator?* Those who already offer a web based configurator allow their customers only specific changes (50%). 30 % are able handle the change of the main product parameters. However the majority sees the topic as very important (5) and few of them are satisfied (see Graph A.26 & Graph A.27 on Page 92).

    Finding 5.20: *None of the participants have currently implemented an overall product adaptability based on a web configurator and therefore have no mass customization approach by its definition, although the importance is valued as very high.*

5.1.6 Averaged summary graph

To come to an overall conclusion the opportunity equation (see Ulwick, 2005, p.45) has served to evaluate all importance and satisfaction question in total. The formula is shown in equitation 5.1, where Opp, Imp and Sat are the correspondent abbreviations.

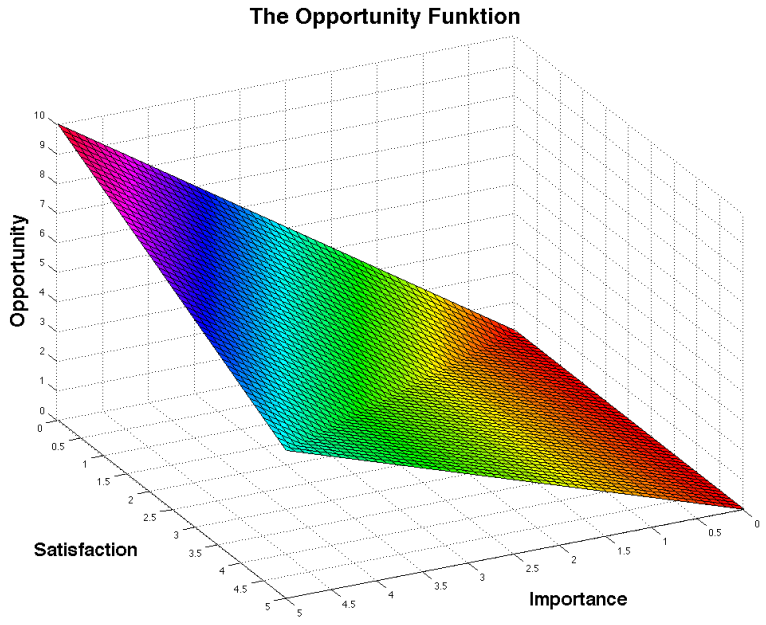
$$Opp(Imp, Sat) = Imp + \ max(Imp - Sat, 0) \tag{5.1}$$

This equitation compares importance (Imp) and satisfaction (Sat) and adds the result to the importance variable, if the value of the difference is > 0 otherwise (< 0) it adds a zero value to importance and therefore doesn't change it at all. The resulting surface has its maximum at $max(Imp)\& \min(Sat)$ and builds a continuum of opportunity values over the range of $\mid 2Imp \rightarrow Imp \mid$. Therefore the value range of the opportunity function can be formulated as:

$$Opp = \begin{cases} 2Imp & : \quad Sat = 0 \\ Imp + (Imp - Sat) & : \quad Imp > Stat \\ Imp & : \quad Imp < Sat \end{cases}$$

A graphical representation of the surface can be seen in Graph 5.1 on Page 61 and the correspondent opportunity values in Graph A.32 on Page 94.

With this method in use, a separation into the four core topics is selected before the overall results are shown. The procedure of presenting is as follows: A summary table is shown where the related question and the corresponding



Graph 5.1: Graphical representation of the opportunity surface

means are presented. The last row summarizes the values to a total mean of the associated core topic (see Table 5.2 – Table 5.5). Then, the opportunity map is presented.

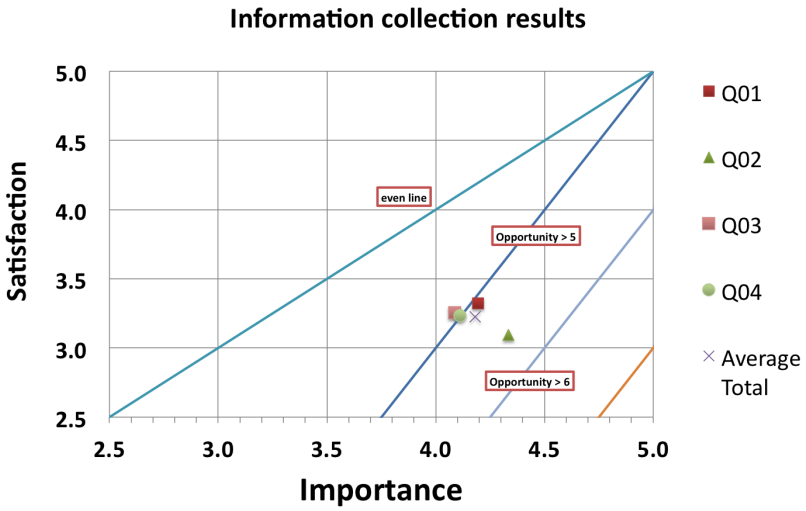
- **Information collection results:** As Table 5.2 shows importance (Imp) values exceeds the satisfaction (Sat) variables all about one point (=25%). The extreme value (Q02) shows that the procedure of collecting customer data is the most importent and unsatisfied one in the core of information collection. They are around an opportunity value of five (see Graph 5.2 on Page 62).

  Finding 5.21: *On average information collection out of the core questions has the highest opportunity value (5.14). Thus data and the corresponding processing and use of the gathered information are essential for the survey participants.*

- **Idea generation & evaluation results:** The importance of idea creation exceeds slightly the importance of customer involvement, however the opposite is true for the satisfaction variable. The mean of both questions is slightly at the lower opportunity side with a value of five (see Graph 5.4 on Page 64).

Nr.	Question	mean Imp	mean Sat
Q01	Which information do you gather about your customers?	4.20	3.32
Q02	How do you collect customer data?	4.33	3.10
Q03	What kind of statistical methods do you use for your segmentation?	4.09	3.26
Q04	How often do you update your segmentation results?	4.11	3.23
	Average total	**4.18**	**3.23**

Table 5.2: Information collection results

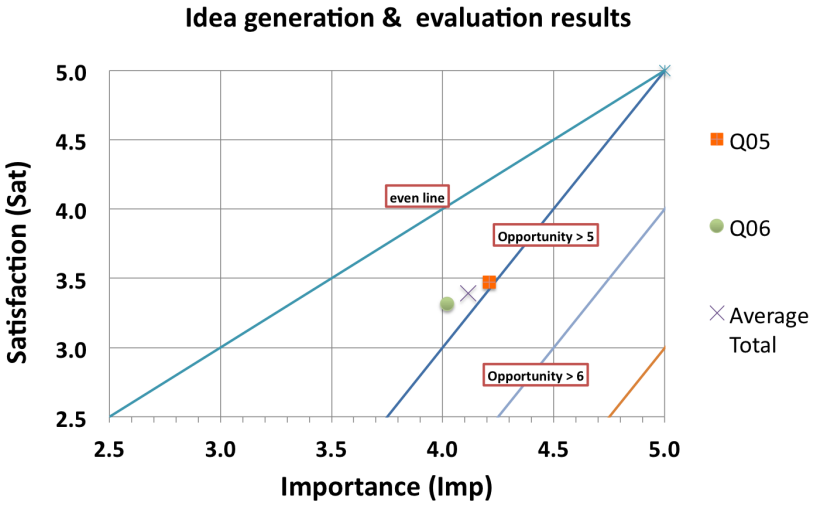


Graph 5.2: Information collection results Imp vs. Sat

Nr.	Question	mean Imp	mean Sat
Q05	How do you support the creation of ideas in your company?	4.21	3.47
Q06	How do you involve the customers into the idea evaluation procedure?	4.02	3.31
	Average total	**4.12**	**3.39**

Table 5.3: Idea generation & evaluation results

Finding 5.22: *Idea creation and evaluation is the second most important core of the survey. With an opportunity value of 4.84 the idea generation*



Graph 5.3: Idea generation & evaluation results Imp vs. Sat

and the customer involvement show that the process of innovation and the evaluation of those are key comteneces inside the companies.

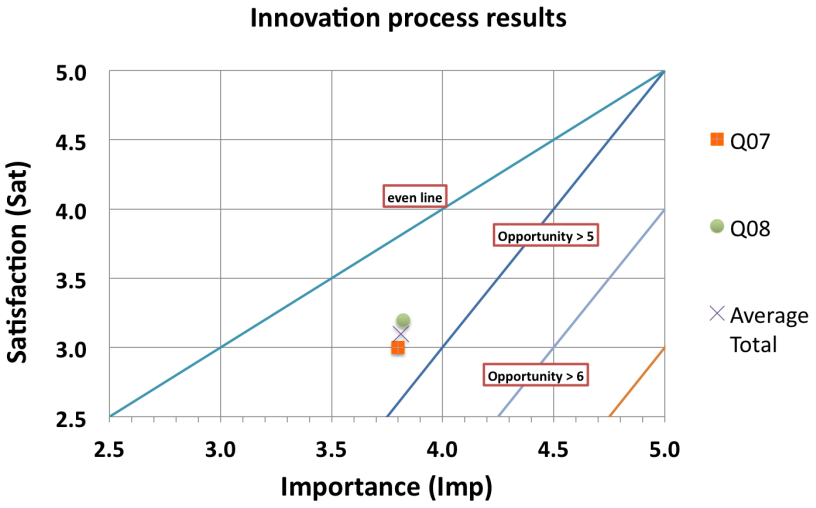
- **Innovation process results:** The structure as well as the method used for idea generation and valuation are valued roughly at the same amount of importance as satisfaction (see Graph 5.4 on Page 64). Furthermore they have an opportunity value of 4.5.

Nr.	Question	mean Imp	mean Sat
Q07	How is the innovation process structured within your company?	3.80	3.00
Q08	Which innovation methods are established in the company?	3.82	3.20
	Average total	**3.81**	**3.10**

Table 5.4: Innovation process results

Finding 5.23: *The innovation process and the methods of innovation are at the fourth position in the core ranking. An opportunity value of 4.53 however, points enough potential for improvements. The process and the methods of innovation do not seem to be the driver of innovation within the perception of the survey participants.*

- **Product customization results:** Both questions have an importance



Graph 5.4: Innovation process results Imp vs. Sat

value of approximately four and the satisfaction of three and half and below (see Graph 5.5 on Page 65). The opportunity of the mean at is 4.65.

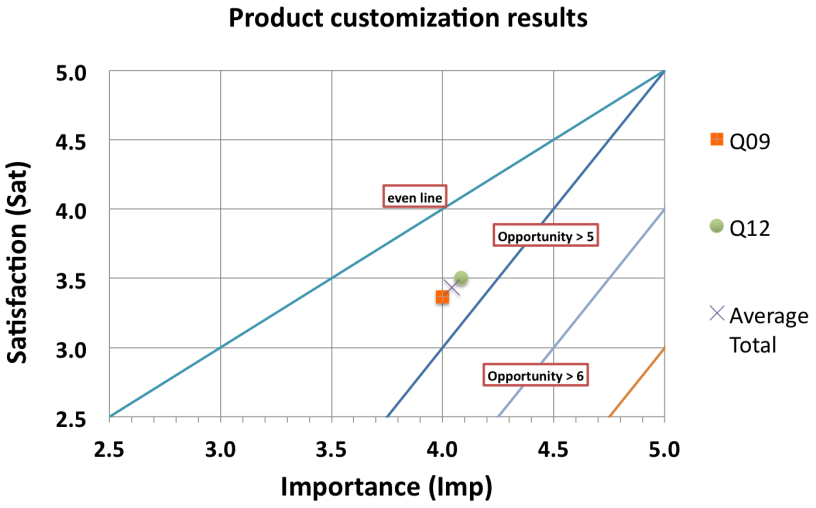
Nr.	Question	mean Imp	mean Sat
Q09	How much are you able to adopt your products due to the needs of customers?	4.00	3.37
Q012	Which possibilities do your customers have in adopting a product with a web configurator?	4.08	3.50
	Average total	**4.04**	**3.43**

Table 5.5: Product customization

Finding 5.24: *On the third position, product customization is a concerning point for the participants. Furthermore participants who already offer a kind of product configurator see still room for enhancements. The opportunity value of 4.65 points out this option.*

5.1.7 Summary and further aspects

The core elements of the survey (information collection, idea generation & evaluation, innovation process and product customization) build enough opportunity for improvements. If a ranking of all those takes place on basis their individual opportunities the Table 5.6 comes into being. However within the meaning of



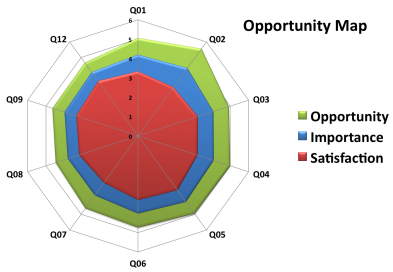
Graph 5.5: Product customization Imp vs. Sat

Innomization all core elements are equitable and an improvement in each of them will lead to an overall improvement of the Innomization approach.

Rank	Core element	Opportunity
1.	Information collection	5.14
2.	Idea generation & evaluation	4.84
3.	Product customization	4.65
4.	Innovation process	4.53

Table 5.6: Rank of core elements

The individual opportunities of each survey question can be seen in Appendix A in Graph A.33 on Page 95 and it shows that every question is beneath the even line where opportunity equals importance and clusters around the opportunity value of five and have therefore appropriately enough room for improvements.



Graph 5.6: Opportunity net

A summary of all important, satisfaction and the corresponded opportunity values are displayed in Graph 5.6 and in large scale in Appendix A in Graph A.34 on Page 96. It can be seen in Graph 5.6 that all opportunity values are larger then the corresponded importance value which is the result of a lower satisfaction value (see Equation 5.1 on Page 60).

Next some Graphs of different viewpoints follows to compare areas of interests

with the remaining survey participants. In other words, does the participants' belonging makes a different general view to the survey questions. E.g. what does the business unit 'marketing' answers to the given questions compared to all other business units like IT, R&D and Customer Service?

- **Does the degree of competitiveness matter?** 53% of the attendees are working in a highly competitive environment. This cluster sees fewer opportunities in the majority of the questions. Especially, they see more than 30% less opportunity in supporting internal idea generation (see Graph A.35 on Page 97).

  Finding 5.25: *Competitive environments do matter concerning all core elements: The higher the competitiveness the lower perceived opportunities caused though consistently higher satisfaction values.*

- **Does the size or a company matter?** 66% of the attendees are working in companies larger then a thousand employees. Less opportunities through the questionnaire caused through more existent satisfaction is the result of this analysis (see Graph A.35 on Page 97). The main difference is in established innovation method.

  Finding 5.26: *The size of a company does matter throughout all asked questions: The larger the company the higher is the already existent satisfaction.*

- **Does the time to market matter?** 29% of the attendees do have a NPD time frame from a half to a year. This group of participants see much more opportunity concerning information collection and partly in idea generation & evaluation as well as in the innovation process itself. Another view is perceived for the product customization where the opportunity is lower (see Section 5.1.6). Exceptions are the supporting of idea generation and the innovation method where the perceived opportunity is less (see Graph A.37 on Page 98).

  Finding 5.27: *Time to market does partially matter in the perceived opportunities for an allover innovation process.*

- **Does the business unit matter?** 41% of the attendees are working inside a marketing or related business unit. Noticeable is the lower satisfaction (18%) for product customization (see Graph A.38 on Page 98).

Finding 5.28: *Business units perceive innovation opportunities in different ways. However there are no general valid statements, which could be mentioned throughout all examined units.*

- **Does the degree of involvement within the innovation process matter?** 28% of the attendees have a high involvement in the innovation process itself. High involved people see a lot of opportunities within the statistical possibilities during segmentation and less for product customization (see Graph A.39 on Page 99).

  Finding 5.29: *High-involved people do see opportunities in information collection and less in the process and customization aspects. There is maybe a kind professionally blinkered of high-involved people because they can't see lot of opportunities.*

- **Does the existence of a web configurator matter?** 21% of the attendees have already an established web configurator or alike. This cluster sees fewer opportunities for customer involvement in the innovation process caused through already existent higher satisfaction. However they see opportunity by the statistical methods as well as the structure of the innovation process (see Graph A.40 on Page 99).

  Finding 5.30: *Participants with an already established web configurator see a lot of potential with data analytics and further product adoption possibilities. However they do not see any further opportunities for customer involvement but they do see improvements for the structure of the innovation process.*

5.2 Interview and workshop results

For both, the interviews and the workshops, the same structure has been applied to evaluate the model. Therefore the results are summarized together.

5.2.1 Customer segmentation

The first section focuses on the customer segmentation part. The participants described the currently established segmentation methods. Inside the telecommunication branch usually classical methods like surveys are used. The criteria for the segmentation are mainly demographical data, revenue and number of

employees. There have been some approaches to include more relevant information in the segmentation. Although the derived outcomes are very valuable, the procedure is executed very rarely. To understand the customer more in detail, additional information next to basic data are needed.

Finding 5.31: *A deep analysis about a customer is necessary to work out a holistic overview. Information about the living environment and used products are relevant as well.*

In the second step of the personal evaluation the participants were asked how they identify a good segmentation. Emotional aspects, which get more important in the future have to be considered. Different evaluation methods are necessary to collect all relevant information. Additionally the procedure must be executed frequently.

Finding 5.32: *A good segmentation need both a quantitative and a qualitative research and analysis.*

The strength and weaknesses of the presented model have been discussed extensively. The centricity of the customer in the segmentation phase is one of the main strength of the model. To collect all relevant information different monitoring methods are necessary. Such information is relevant for standard products and for adoptable products as well. Due to the usage of the information for different departments inside the company the outcome of a segmentation based on customer behavior is valuable. The presented model enables a new approach for segmentation but the collection of the information is a critical success factor.

Finding 5.33: *The monitoring of the customer behavior is a critical success factor to run the Innomization approach. The derived information based on a comprehensive segmentation is relevant for several departments and important for the development of a product.*

5.2.2 Customer needs

The second section of the interviews and workshops covered the identification of the customer needs.

The company culture has a huge influence into the development of new products inside a company. Therefore the participants were asked to describe their culture for product development inside their company. Usually telecommunication companies search for quick wins, this means that they prefer product

developments, which can be realized in a short time. In Austria, due to the high competitive market the telecommunication companies are more risk averse. Open innovation, which means a high collaboration with the customer at the development of new products, is not established. The participants assume, that this could be related with the missing culture for negative feedback inside the company.

Finding 5.34: *Organizational changes have to be designed. Those are the bases for a new product development approach.*

The participants of the interviews and the workshops had to describe the current established procedures at the company. Customers are involved in the product development process to test product designs and prototypes. Currently, customers are not involved in the idea creation phase. In case that a specific selected business customer asks for a new product, the collaboration with this customer is possible. To identify customer needs, telecommunication companies trust selected partner and suppliers to identify those needs. Therefore the identification and design of process is outsourced to solution partner.

Finding 5.35: *Collaboration with customers is not established, but the telecommunication company trusts partner to identify the needs and to develop suitable products.*

The participants have discussed the Innomization model. Due to the necessary of adoptions inside the company a commitment by the management is needed. Additionally, to run procedures for the identification of the customer needs, money, time and human resources are needed. The management commitment is necessary to dedicate those resources. There are several methods available to identify the customer needs. Methods should not be stand-alone procedures; they should be part of the procedures inside a company. The complexity of the methods occurs trainings for all involved employees.

Finding 5.36: *Customer needs oriented methods are important but should be established as a process. The commitment of the management board is needed to run such an approach.*

5.2.3 Product customization

The third section of the interviews and workshops focuses on the adaptability of products. The idea of product customization is not new inside the telecommunication branch. Several competitors tried this approach but didn't succeed.

Adaptability of products leads to high complexity inside the company. Customers do not appreciate the possibility to change any specifications of the product. They expect a standard product, which covers most of their needs. Nevertheless a smart product design based on product customization could enable a strong differentiation to the competitor.

Finding 5.37: *The higher product variability does not always lead in a higher acceptance of a product.*

Currently a web-based tariff-recommendation application is available for the customers. Not all customers use this tool. The acceptance of the customers is mainly based on the usability of the application. To run a product customization approach a web-based configurator is a necessary. The threat to overcharge the customers has to be taken seriously.

Finding 5.38: *A web-configurator is a crucial element for customization. Assistance and support to lead the customer through the web-configurator is expected.*

Finding 5.39: *Some customers are overwhelmed and therefore not able to select a suitable product. Product bundles should support the customer to find the most suitable solution.*

Adoptions of products are partly possible for a couple of products. The in-house complexity is one of the main hurdles for such an approach. Therefore the selection, which product should be adoptable for the customers, should be done carefully. Mass products are not always suitable for the discussed approach whereas products, which target a specific customer group, could be used.

Finding 5.40: *Not all products suits for a customization approach. Therefore, the selection of appropriate product has to be done carefully.*

5.2.4 General considerations about the introduction of Innomization

To identify the hurdles for the introduction of the Innomization model a comparison with the current established procedure is done.

Currently some core elements for the innovation process are outsourced to partner. To introduce the Innomization model inside a company the mindset have to change.

Finding 5.41: *The competences to work on innovations are needed inside a company. The handling of innovations is a critical success factor. This includes the selection of suitable ideas but also the empowerment to terminate an idea.*

The competences to run the Innomization model have to be built up inside the company. Although, knowledge in the part of segmentation is already available, additional trainings are needed. Methods to identify customer needs are not established. Currently the companies trust more in selected experts, which have experience in product development. Product customization is an advantage compared with competitors, but only useful for some products.

Finding 5.42: *All three elements of the model are relevant and new communication processes have to be considered.*

The participants identify the complexity of the model as critical. In case that more synchronizations between the involved departments are necessary the efficiency of the procedure could get lost. Furthermore, all departments have to be convinced about the added value of the Innomization model, otherwise they will not follow the new approach.

Finding 5.43: *The efficiency of the procedure has to be ensured and the integration of the model has influence in the culture of the company.*

Chapter 6

Incorporate the findings

In this chapter the findings from Chapter 5 are aggregated and incorporated in the initial Innomization approach, thus a suitable and adapted prospect of the model is created. The first section treats the general related findings whereas the remaining sections are dedicated to the three main parts: behavior segmentation, customer needs, customization of the Innomization model (see Figure 3.3 on Page 37).

6.1 General considerations

Innomization is a philosophy suitable for middle to large sized companies especially for telecommunication related industries. To overcome this disadvantage the concept has to be changed in the following points (see Finding 5.1 – 5.3):

- ***Available data:*** Telecommunication industry is used to store a lot of customer data where as other industries aren't. Thus a concept of data warehousing and an integration of Information-Communication-Technologie (ICT) as a source of decision making have to be educated in other industries. This means prior to a Innomization concept the hedger has to be convinced that the future of business is based on available data and the corresponding analytics.

- ***Small to medium sized companies:*** The complexity of the model is high and within large companies there are enough specialist around, who can cope with such a complex system. However, the all over approach (frontend-, backend systems and software) must be accessible for all types of user in an user friendly way and system. The complexity can only be

reduced by simple interfaces. With this in mind the applicability for small and middle-sized companies should be addressable.

Integration 1: *Building a framework of education in the sense of "prepared for future business" as a consulting offer and an easy to use software solution is a must have to succeed in other industries but also in smaller companies.*

Innomization is focused on product management, which is mostly inside the marketing department and does not differentiate between different types of projects (types of product developments). Moreover it does not incorporate different responsibilities although the existence of those. To increase the acceptance of the Innomization approach the following changes have to be done (see Finding 5.4 – 5.7):

- ***Support for different business units:*** Marketing is a driving business unit at least in some companies. However there are a lot more units enclosed in the innovation process, therefore a mapping of the organizational structure with the Innomization approach has to be executed and all relevant acting organizational units have to have their corresponding item within the Innomization approach. For example a customer service department is dedicated to a part of the customer needs search during the customer behavior analysis.

- ***Types of NPD:*** Currently there is no differentiation between types of product developments like complex to simplified or strategy conform to non-conform ones. To cope with these fundamental requirements a pre-evaluation and a corresponding ranking on a basis of defined parameters have to be developed.

- ***Support for different sources of ideas:*** Innomization does not take care of different sources of innovation, it is currently focused on an internal approach only. To open this Innomization model towards an open innovation approach not only the existing customers have to be integrated furthermore none current customer should be integrated by using a toolkit. Therefore a product range or product class could be individually defined where the Innomization model would then be extended on an individual customer base (adoption per customer).

Integration 2: *Open the Innomization model not only towards open innovation integration but further introducing an evaluation catalog and the corresponding solution path within the Innomization model and a definitive responsibility structure will extend the model to an up-to-date all over innovation approach.*

There have been some general hints which could further improve the Innomization model and lead therefore to a higher acceptance (see Finding 5.25 – 5.30):

- ***Perceived opportunities:*** Under some condition the perceived opportunities are much lower as the overall one. These conditions are mostly driven by the degree of competitiveness, the size of the company and average time to market. Not asking the reasons for such a phenomenon a general strategy to cope with those is to address these specific topics in explaining the individual advantages. This means for example that the advantage of the Innomization approach related to high market competitiveness has to be explained, especially through case studies for example.
- ***Stuck in a rut:*** High involved people as well as pioneers in opening the innovation doors for customers perceive in their professional field less opportunities. This could have many reasons, however coping with that means a psychological challenge by taking the individual mind-sets and changing this to a new overall vision.

Integration 3: *Creating individualize and customer adapted showcases have to be developed to ease the process of explanation. People have to cope with the new Innomization model and therefore the people are the main target for persuasion. As a consequence the management has to live a new vision to incorporate a new Innomization model.*

6.2 Behavior segmentation

Information collection and the processing of data (analytics) is a very important aspect of the Innomization approach to drive a behavior segmentation (see

Finding 5.21), however there are some supplements which have to be integrated:

- ***Business dynamics:*** Although the importance of customer data is existent within companies the utilization of those is by fare not satisfying (see Finding 5.8 & 5.12). Segmentation, as an example, is still not a dynamic approach in fact it is a per year repeating, sequential procedure with low contentment. Dynamic approaches are not in the mind of companies and there management. To give the companies an understanding of business dynamics (BD) in coherence with data mining one could build up a BD-model, e.g. for dynamic segmentation, which will create a dynamic customer "picture" and shows the variances if the data changes. Another opportunity is to build up a model to prevent customer leavings where left customers and their habits are related to existent customers and thereby showing the path of potential leaving customers.

- ***Data mining:*** The advantages of exploratory data analysis (EDA) isn't used in its fully potentiality. Clustering methods are used but methods of artificial intelligence (AI) like artificial neuronal network (ANN) and machine learning (ML) aren't used very often. It seems that there is little knowledge around data mining at all (see Finding 5.9 & 5.11). This lack of knowledge can be overcome by presenting simple cases which explains how knowledge can be extracted from data and information.

Integration 4: *Easy and understandable business dynamics models have to be developed to help customers to understand the advantage of a dynamic Innomization model. Furthermore, examples of data mining possibilities have to be taken for the explanations of knowledge extraction to feature new ways of business analytics.*

6.3 Customer needs

The Innomization model is based on the collaboration with customers to identify their needs. Structured methods and defined interfaces to other parts of the model are core elements.

- ***Idea generation:*** The model is designed to involve the customers into the procedure. This core element of Innomization must be retained (see

Finding 5.13 & 5.22). The evaluation inside the model is currently done as part of whole procedure. A list with selected criteria, which provides indicators, is currently not part of Innomization.

Integration 5: *Providing a list with the core criteria to select ideas could increase the efficiency of the procedure. The model has several exit points to shorten the procedure. An additional and flexible exit would be possible based on a list of criteria to evaluate ideas. Those criteria could be defined dynamically, which means that they can be changed through the available information inside the model.*

Innomization enables to run different methods to identify the customer needs. There are several findings (see Finding 5.14 – 5.16 & 5.23) about the method to identify the needs of the customers.

- ***Method to identify customer needs:*** The involvement of customers is currently mainly based on focus groups. The satisfaction with the outcome of such approaches is not very high. Therefore alternative methods to enable a better collaboration with the customer are welcomed. Methods have to be structured and process oriented to enable different employees to execute the procedure.

- ***Involvement of the management:*** The commitment of the management is a necessary for the success. A new approach for the identification of the customer needs requires the commitment of the decision maker. Several changes inside the company process and culture have to be done to enable a successful integration of the described approach.

Integration 6: *Handbooks, which describe the procedure and the steps in detail enables a quick understanding of the procedure. The knowledge transfer between the employees is higher and easier by using a common language for the procedure. The interfaces of the model have to be described more in detail due to the involvement of different departments. A description should enable the common understanding.*

6.4 Customization

To meet customers expectations and to differentiate from competitors are the main idea behind the customization of a product. The model brings all collected information into a customization approach. Based on the knowledge about the behavior and about the needs a suitable product for the customer can be designed.

- ***Selection of products:*** Not all products can be adopted for a customization approach (see Finding 5.40). Some products need a lot of in-house adoptions but the customers do not appreciate more possibilities for adoptions.
- ***Overcharge of customers:*** Customers expects suitable products, which fulfill their needs easily. A huge offer of variations could lead to an overcharge of the customers. An example is voice tariffs for mobile telecommunication. The customers expects suitable tariffs but the majority of the customers do not want to analysis their usage behavior and to customize their tariff model. They prefer a product bundle, which fulfill their expectations sufficiently.

Integration 7: *After an initial start up phase the experiences need to be summarized to derive criteria for the selection of products, which fit into the customization approach of the model. The indicators inside the list should be based on the in-house process but also on the market situation.*

The process, to handle high product adaptability, is a huge challenge. The survey results and the workshop results as well visualized clearly that the integration of such an approach is important for the sustainable company success but also sophisticated.

- ***Process and culture:*** Finding 5.43 describes that the integration of such an approach has a huge influence into the company culture. Structured information sharing is essential for a long-term success. Break the boarders and fostering the collaboration between the departmenti£¡s results often in a new company culture.
- ***Efficiency of the process:*** Intensive collaboration and knowledge sharing should not led to an inefficient process. The collaboration between the

departments is important but the procedure how this should be handled has to stay lean (see Finding 5.42 & 5.42). Due to the relevance of all elements of the method a structured procedure must be ensured.

- ***Order-to-bill:*** Products have to be considered from the point of order till the billing of the customer. All elements, as service, maintenance, support etc, are important from a customerï£¡s point of view. In case of product customization the processes for the handling of all customer related elements have to be adopted (see Finding 5.17).

Integration 8: *An audit to get an overview about the current company culture is necessary before the integration of a model such as Innomization can be done. The identification of all changes is previously recommended. This includes a description of the current status of the collaboration and the interfaces between the departments.*

The usability of the web-configurator is a core element for the success of product customization. This element is the interface for the customer to communicate his needs and expectations (see Finding 5.18 – 5.20 & 5.24 & 5.38).

- ***Usability of the web-configurator:*** The user interface has to be understandable for the customer independently of his experience. The configurator should led the customer to a suitable product as fast as possible. Recommendations and ratings of other user help the customer to make a decision.

- ***Experiences:*** A web-configurator, to enable the customer to adopt his product for his needs, is rare. Nevertheless, especially in the telecommunication branch there are several web-based recommendation applications in usage. The experiences with those are mainly positive. The customers also highlight the importance of this tool.

Integration 9: *A web-based recommendation tool is useful for the customers. The application to configure a product should be based on the procedure of this recommendation tool. Before the web-configurator starts the user should use the recommendation tool to get better insights into the product design. The adoptions of the suggested product can be done in the web-configurator as well.*

Chapter 7

Summary and prospect

In the last section of the master thesis there is a summary about the prior development oft this text in hand. Then, an outlook to an in-house implementation of Innomization as well as an entrepreneurial prospect will complete this master thesis.

7.1 Summary

Relevant data about customers, data analysis, new product development and product customization have been the central elements of engagement within this master thesis in hand and has been analyzed and discussed from different perspectives. Chapter 2 has introduced concepts, terms and variables of the up to date literature status out of the main pillars of Innomization. In doing so, it has been shown that although the individual pillars have a large source of literature, there exist very less research in a combination and concurrent, dynamic interaction of those. Moreover it has been shown that complexity and unawareness are the main forces that are currently inhibit companies to use the full range of the involved Innomization frames.

Subsequently it has been shown in Chapter 3 how a possible all over solution could look like by presenting the Innomization model. Thereby extracting the individual advantages of the involved methods and combining those to a new dynamic innovation approach. Furthermore it has been shown where the main distinction of a classical product development process and the Innomization approach exists as well as a first evaluation of the strengths and the weaknesses of the initial model.

A double research approach, namely a quantitative as well as a qualitative one has been used to evaluate and to learn from existing firms concerning the current,

underlying innovation methods. The qualitative research has been divided into single interviews and group workshops to incorporate dynamic group behavior. The concept and the methodology are described in Chapter 4.

The research has shown that there exists an overall opportunity of improvements concerning a dynamical new innovation approach. Main driver for this fact is that companies lack in their possibilities of incorporating customer data into their product development approach and use those information for further product customizations. The weakness is mostly driven by the analytical weaknesses of data analysis and shows a clear picture that companies know the potential possibilities but do not have the ability to change the mismatch. Approximately the same results have been extracted from the interviews and workshop results. The main results hereby are the need of an organizational change within the company concerning culture and management attention to drive a new overall Innomization approach. This leads to the assumption that companies are searching for an incorporated innovation method and at the same time opens the door for an adopted Innomzation approach. Those results are described in detail in Chapter 5.

The learnings of the research and the ensuring incorporation of those in the prior Innomization model are explained in Chapter 6. This has lead to nine fundamental integration points to adapt the initial Innomization approach to be successfully in different aspects. With this enhancement of Innomization the principal research question of how a classical new product development process can be changed to a dynamical one, can be answered by the following main thesis:

The change from a classical product development process to a dynamical one can be executed by:

1. **an intelligent combination of different methods inside an innovative approach and**
2. **incorporating the identified range of integration aspects.**

This final thesis validates the research question and opens the door to new successful innovations and hereby improves competitive advantages for the company in use.

7.2 The in-house integration prospect

This section focuses on the in-house integration of the model Innomization. The steps to integrate the model are discussed and indicated.

Innomization is also a change of the mindset of the employees. It is not only a procedure or a tool, which can be applied, based on a handbook. Furthermore, the model requires organizational adoptions and an intensive dealing with the procedure. Therefore, to integrate the Innomization model inside a company several steps are necessary.

First of all a holistic analysis of the established processes inside the company should provide an overview about the current situation. This analysis should evaluate the process but also the interfaces between the different involved departments. Additionally the outcome of the procedure has to be evaluated in relation to the investment and in relation to the processes. The innovation strategy of the company is a core element for the introduction of the Innomization model. Finally, the analysis should also involve the company culture and the competences of the employees.

All those parameters must be collected and understood to derive the measurements to integrate the Innomization model. Depending on the analysis one of the first steps should be the creation of the IT-infrastructure. This includes the monitoring systems but also the reporting applications. The design of the IT-infrastructure should consider all interfaces between the departments. Due to the importance of the communication of the involved persons and the information flow the reporting tools are a critical success factor. The collected information inside Innomization is huge, therefore an intelligent mechanism, which work up the appropriate data must be part of the reporting tools.

The second core element of Innomization is the adoption of the internal processes to run a product customization approach. An analysis of the product portfolio is necessary to identify those, which have a known internal complexity and are easy to handle. Those products need to be structured on a modular basis. Based on those modules, the customers can adopt the products due to his needs. This results in the requirements for the web-configurator.

The third element focuses on the methods for the identification of the customer needs. Several experts and a database with different customer types are necessary to derive the needs of the customers. The database is the basis to run various methods for the identification of those needs. Additionally this element of Innomization needs the most training for the employees. To apply the methods the procedures, the suitable scopes and the strengths and weaknesses must be

known.

In parallel, a culture change and education program for all employees is needed to achieve a change in the mindset. The centricity of the customers must be proved by different measures like the commitment of the management and the establishment of new tools and procedures. The initial start up phase should include a road-map, which describes the phases of the establishment of the model.

Summarized, an example for the road map could be:

1. Definition of the innovation strategy of the company
2. Analysis of the current established procedures and IT structure
3. Analysis of the product portfolio
4. Building of modules from product elements
5. Definition of the interfaces, the needed information and the information flow
6. Adoption of the internal processes to compose the modules of the products
7. Establishment of a web-based tool to enable the customer to adopt the product
8. Definition of the procedure to analyze the data
9. Definition of several methods to derive the customer needs
10. Trainings of the employees
11. Structured transfer of the collected information to enable the dynamic approach
12. Derive of pattern to build up a prediction model

7.3 An entrepreneurial prospect

Due to the fact that the result of the master thesis shows clearly that there is an overall opportunity for improvements the question of an entrepreneurial venture will come to mind and thereby helping companies to integrate an Innomization approach.

The Problem

As this thesis has shown there exists the inability of companies in different industries to combine different sources of information (knowledge) to strengthen their innovation process. They yet do not have an integrated, all over new product development procedure, which uses the advantages of deep data analysis and the correspondent integration into the product design to increase customer satisfaction. The thesis furthermore shows that those companies lack in the possible enrichment of goal-directed product customization. Summarizing those problems combined with the increased market pressure companies have to find the right services and product for their customers to succeed in the market.

The Solution

Customer have to be treated as individuals with different needs and expectations. Innomization extended with the learning from this thesis builds the bridge to different knowledge sources and can therefore overcomer the existing problems of companies. Innomization with its focus on the three main pillars of innovation, namely data analysis, new product development and product customization, is tailor-made for this need and enables companies to focus on single customers' needs but simultaneously optimize the increased cost structure of markets of one by using advanced analytical method to explore the key values for customers which are mostly shared throughout a larger customer entity.

The Industry

Innomization suits into the business ICT consulting industry at first hand. However due to the need of easy to use software solutions for data analysis, idea generation or customer toolkits, Innomization is also in the software industry. Thus a classification in a single industry is difficult, however consulting combined with software development is often seen in the market. And with the specialization in the innovation environment this generates a unique market positioning.

The Entrepreneurs

Both authors have a deep understanding of the ICT market, which they have acquired through longstanding working experience within the industry.

Martin has a lot of experience in innovation processes through his passion for this topic and has a master degree in industrial engineering, whereas Karun has his strength in product development and ICT-technology and has a master degree of advanced studies in information technology. Thus the partnership will cover all related aspects of an Innomization venture. Furthermore they have extended their knowledge through a MBA for Entrepreneurship & Innovation which has enriched their passion of acting as entrepreneurs.

The Business Model

Innomization operates only in the B2B-Market and has for its launch five main products:

- General Innovation Consulting
- Supervision and implementation of Innomization (Full Service)
- Analytics & Data Mining Consulting
- NPD Consulting
- Product Customization Consulting

and is therefore rather simple. The main focus is on sales and fulfillment and will be preformed by the entrepreneurs themselves. On the other hand if software solution is a topic that cannot be developed on client side there will be a out-sourced solution possibility within Innomization, however not prioritized at the beginning of the venture.

Open research

Due to the fact that this thesis has only focused on the development of the Innomization method itself a large portion of research has to be done for the entrepreneurial venture. Following core elements have to be analyzed priorly in detail:

- Competitor, Industry & Customer Analysis
- Market Strategy Development (4P's)
- Financing Strategy
- Organizational Setup
- Operation Management

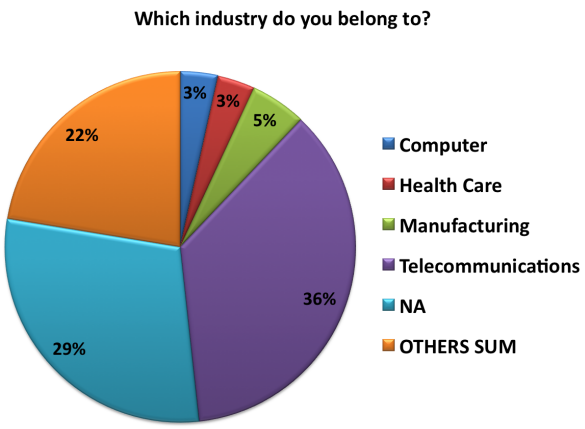
Closing

The quotation of Peter Drucker inspired us at the beginning of the master thesis. To enthuse customers to have a sustainable relationship is absolutely important for a long-term success. To understand the customers and to search for suitable products are needed core competences for companies. Innomization is a model, which supports companies on this endeavor. We close this master thesis with the famous quotation of Henry Ford:

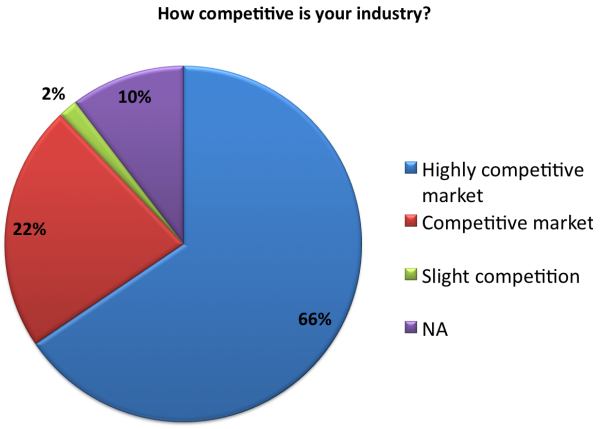
> "If I had asked people what they wanted, they would have said faster horses." (Ford, 1910)

Appendix A

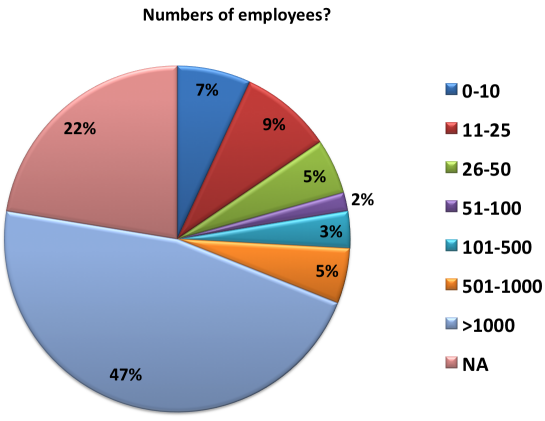
Graphs representing the findings



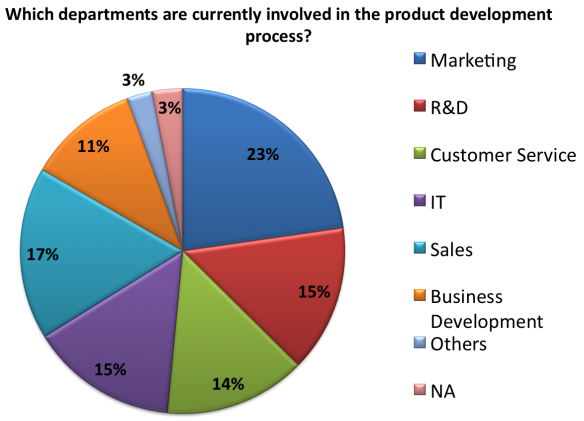
Graph A.1: Industry distribution



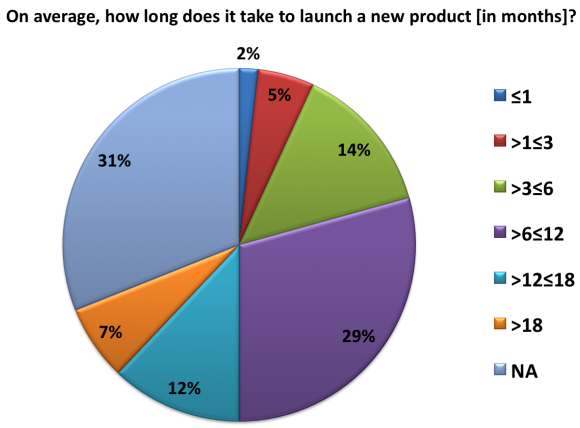
Graph A.2: Competitiveness of industries



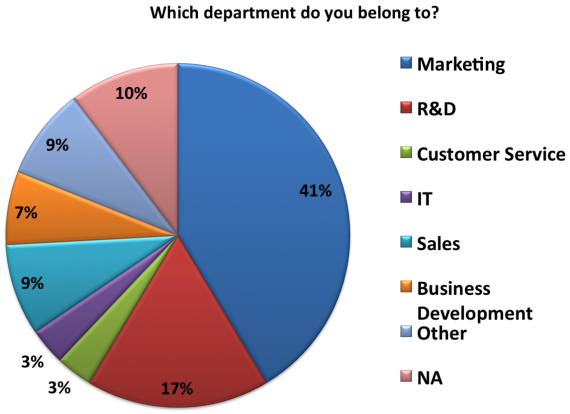
Graph A.3: Number of employees



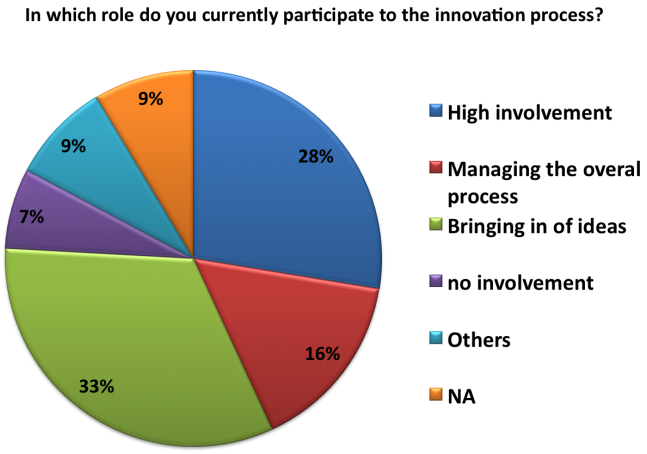
Graph A.4: Involvement of departments



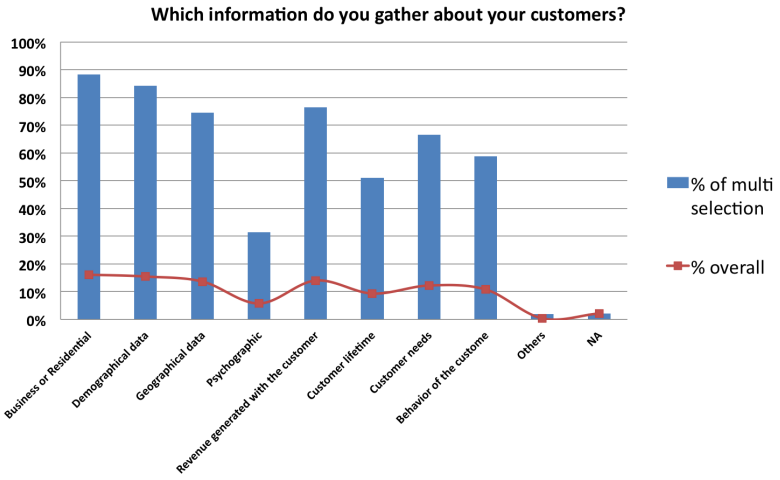
Graph A.5: Average time of NPD projects



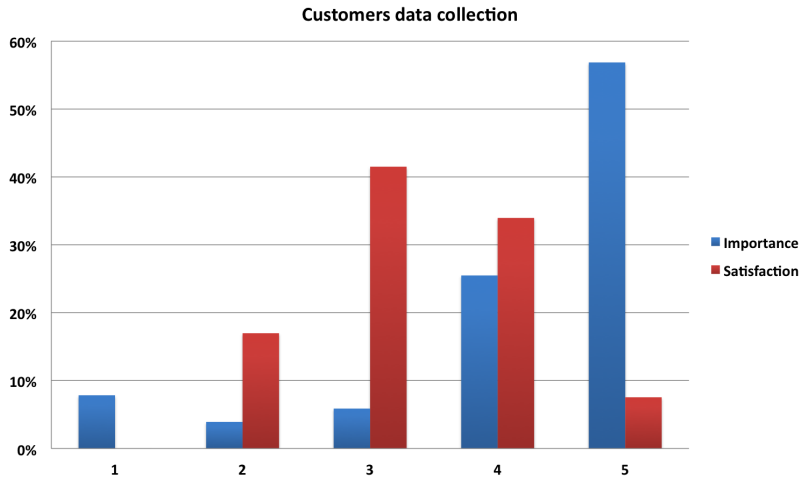
Graph A.6: Belonging to department



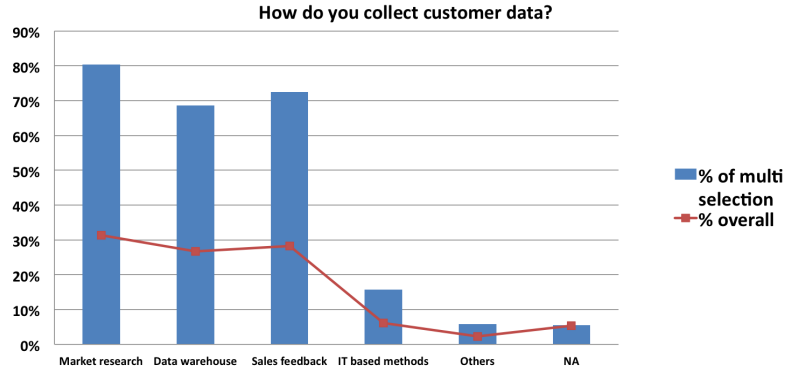
Graph A.7: Role of participation



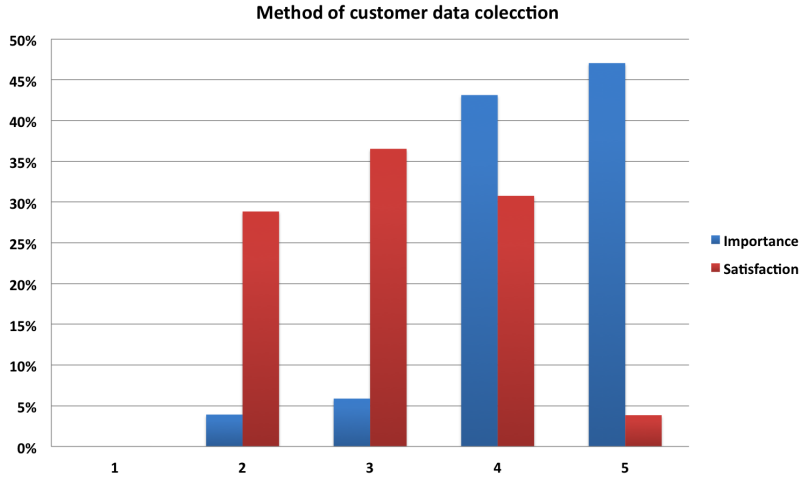
Graph A.8: Collection of customer data



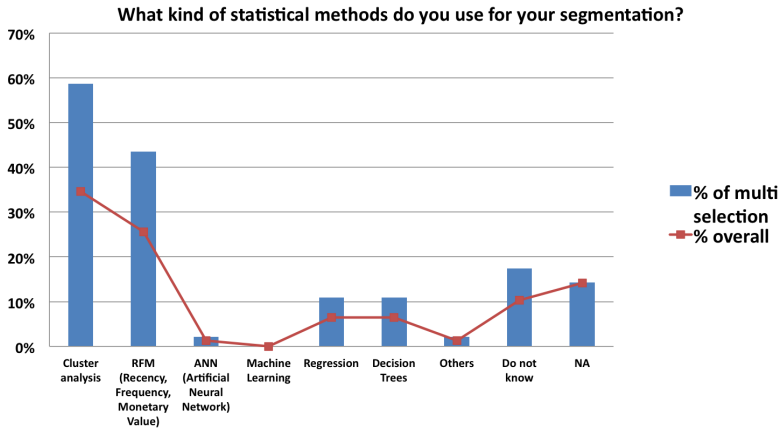
Graph A.9: Collection of customer data (Imp vs. Sat)



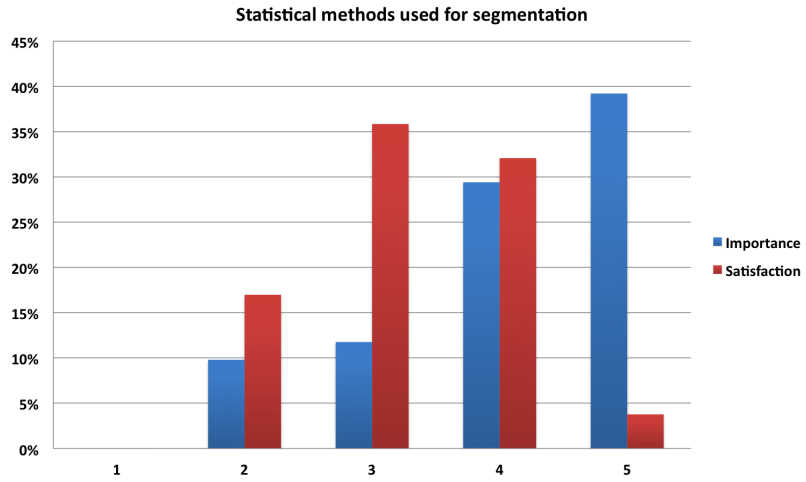
Graph A.10: How data collection happen



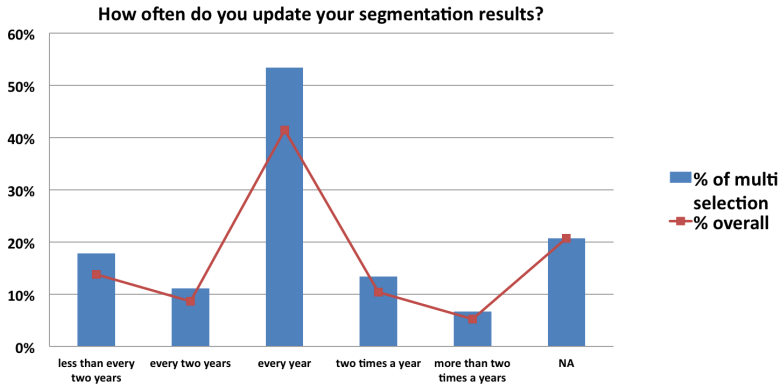
Graph A.11: How data collection happen (Imp vs. Sat)



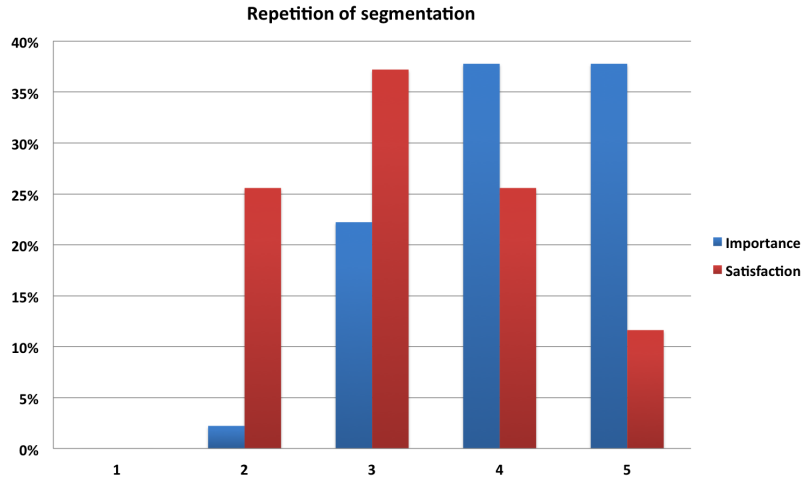
Graph A.12: Use of statistical methods



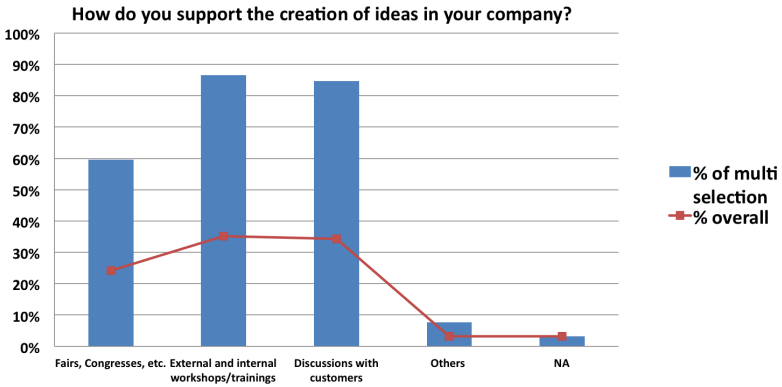
Graph A.13: Use of statistical methods (Imp vs. Sat)



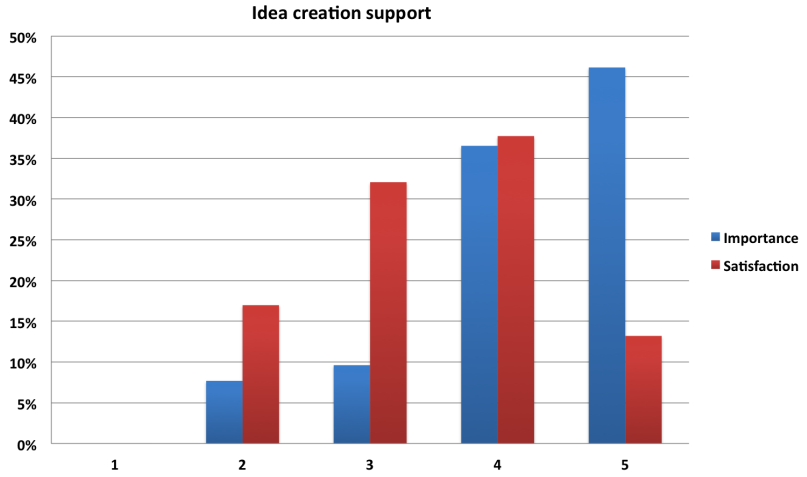
Graph A.14: Renewal of segmentation



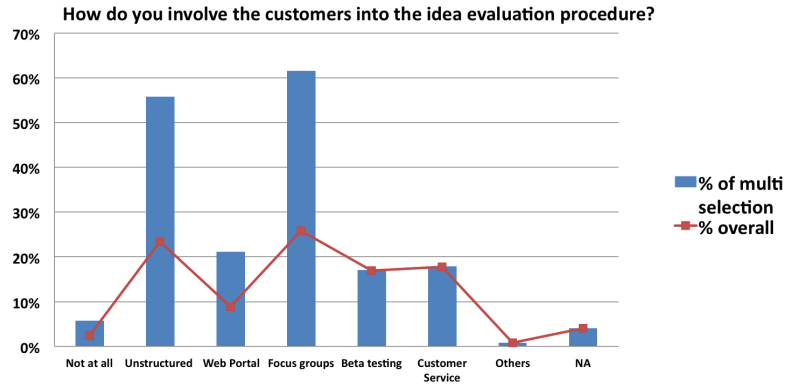
Graph A.15: Renewal of segmentation (Imp vs. Sat)



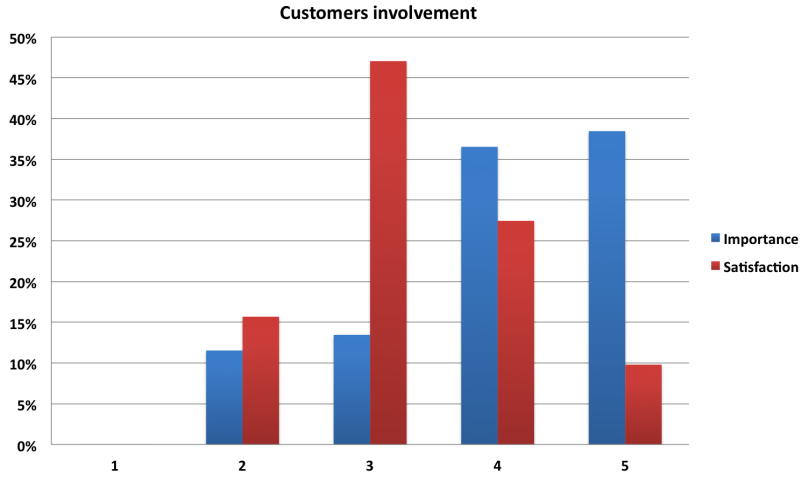
Graph A.16: Support of idea generation



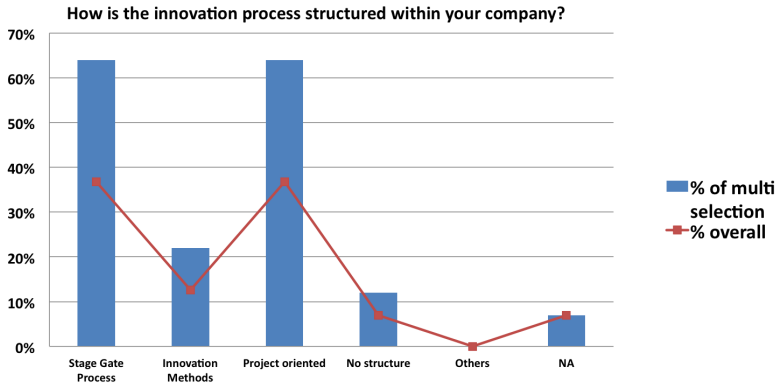
Graph A.17: Support of idea generation (Imp vs. Sat)



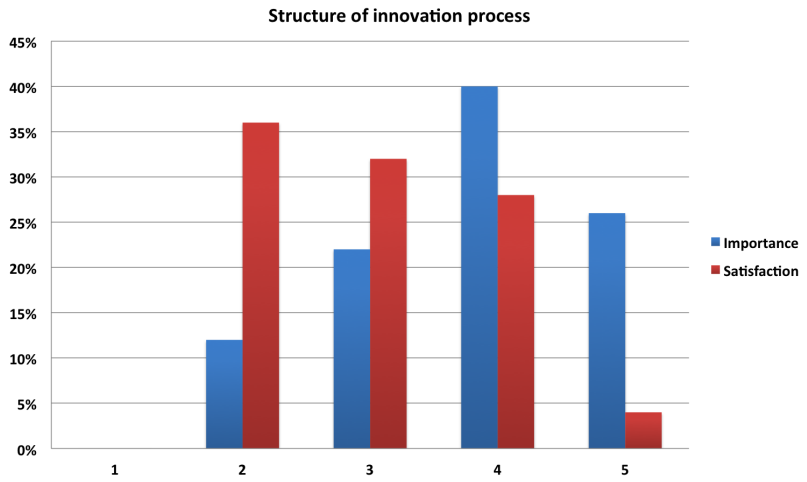
Graph A.18: Customer involvement



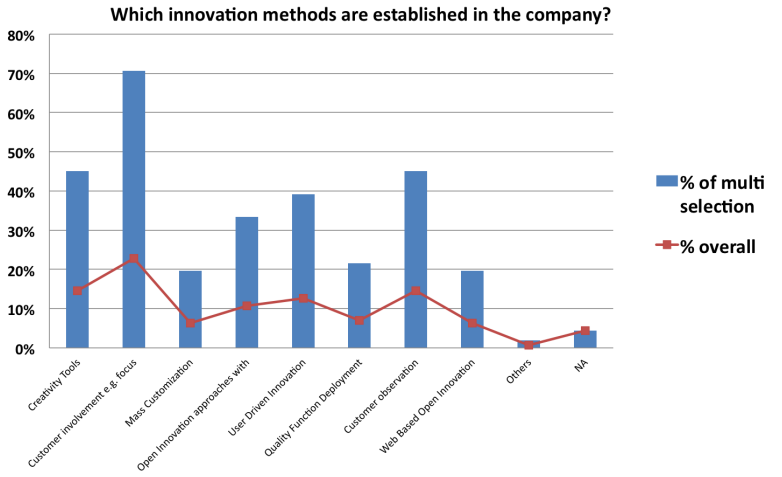
Graph A.19: Customer involvement (Imp vs. Sat)



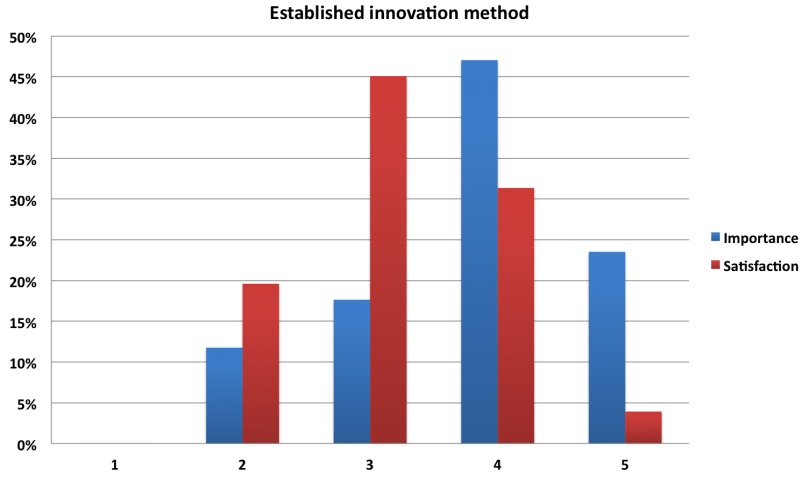
Graph A.20: Structure of the innovation process



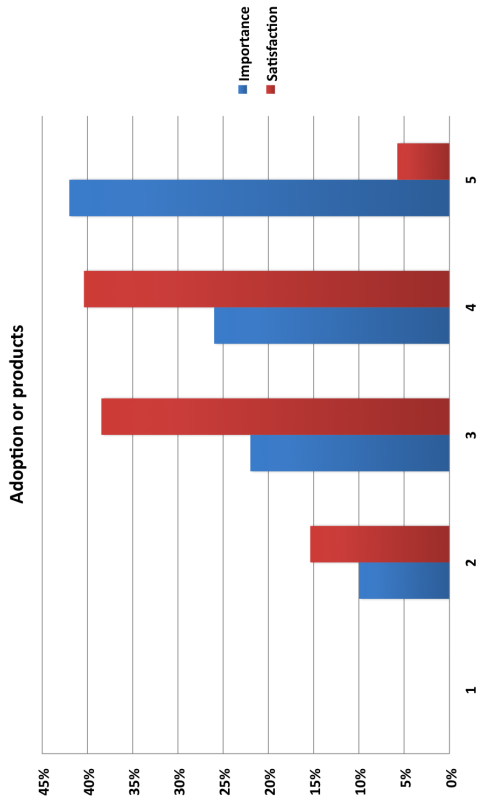
Graph A.21: Structure of the innovation process (Imp vs. Sat)



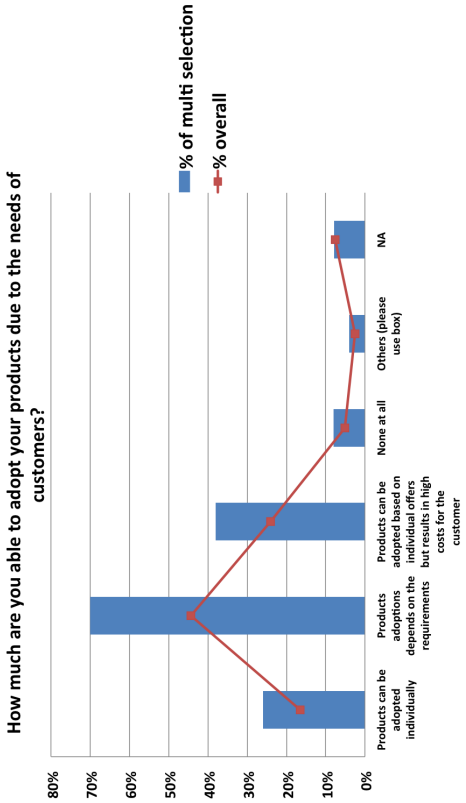
Graph A.22: Innovation process



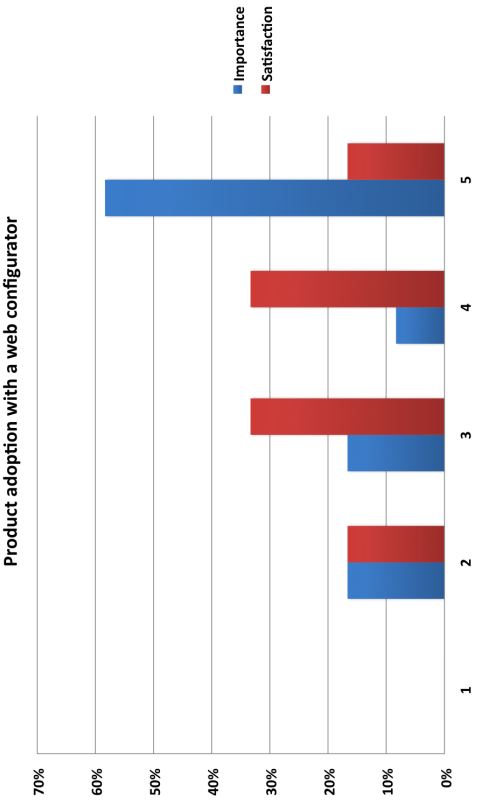
Graph A.23: Innovation process (Imp vs. Sat)



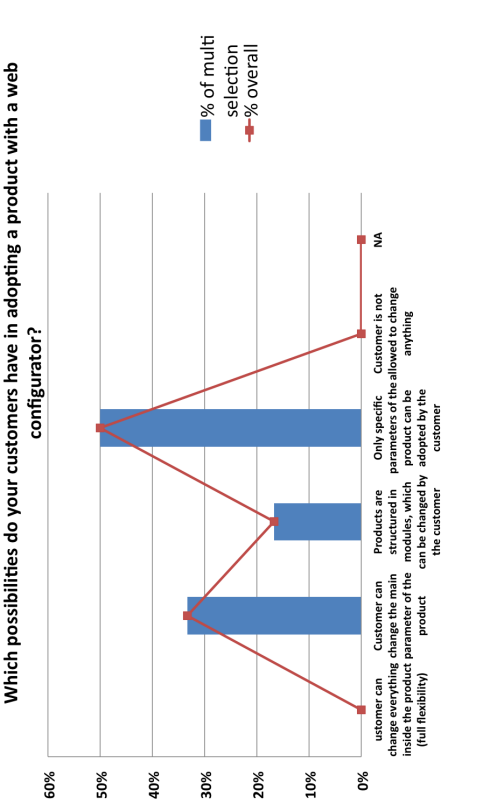
Graph A.25: Structure of innovation process (Imp vs. Sat)



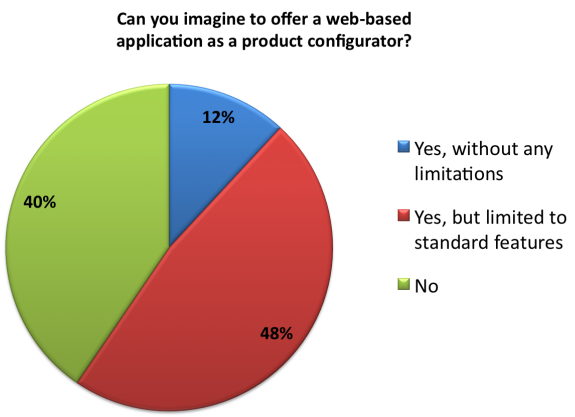
Graph A.24: Structure of innovation process



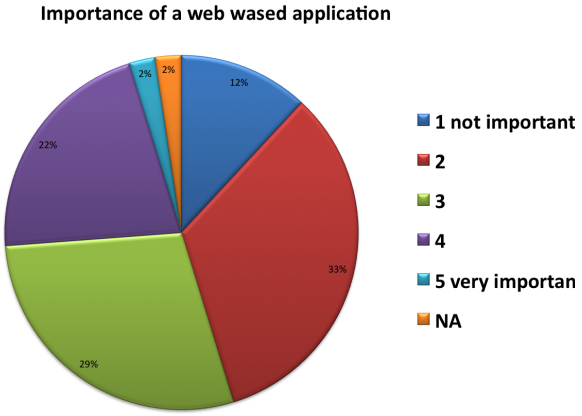
Graph A.27: Product adoption possibilities (Imp vs. Sat)



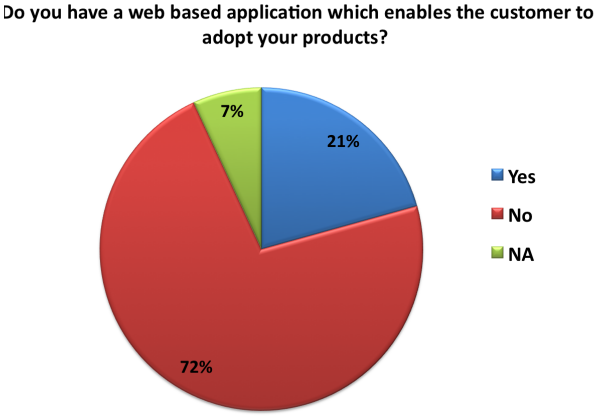
Graph A.26: Product adoption possibilities



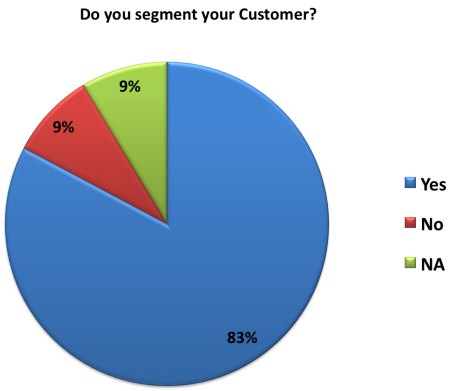
Graph A.28: Imagination to offer an web configurator



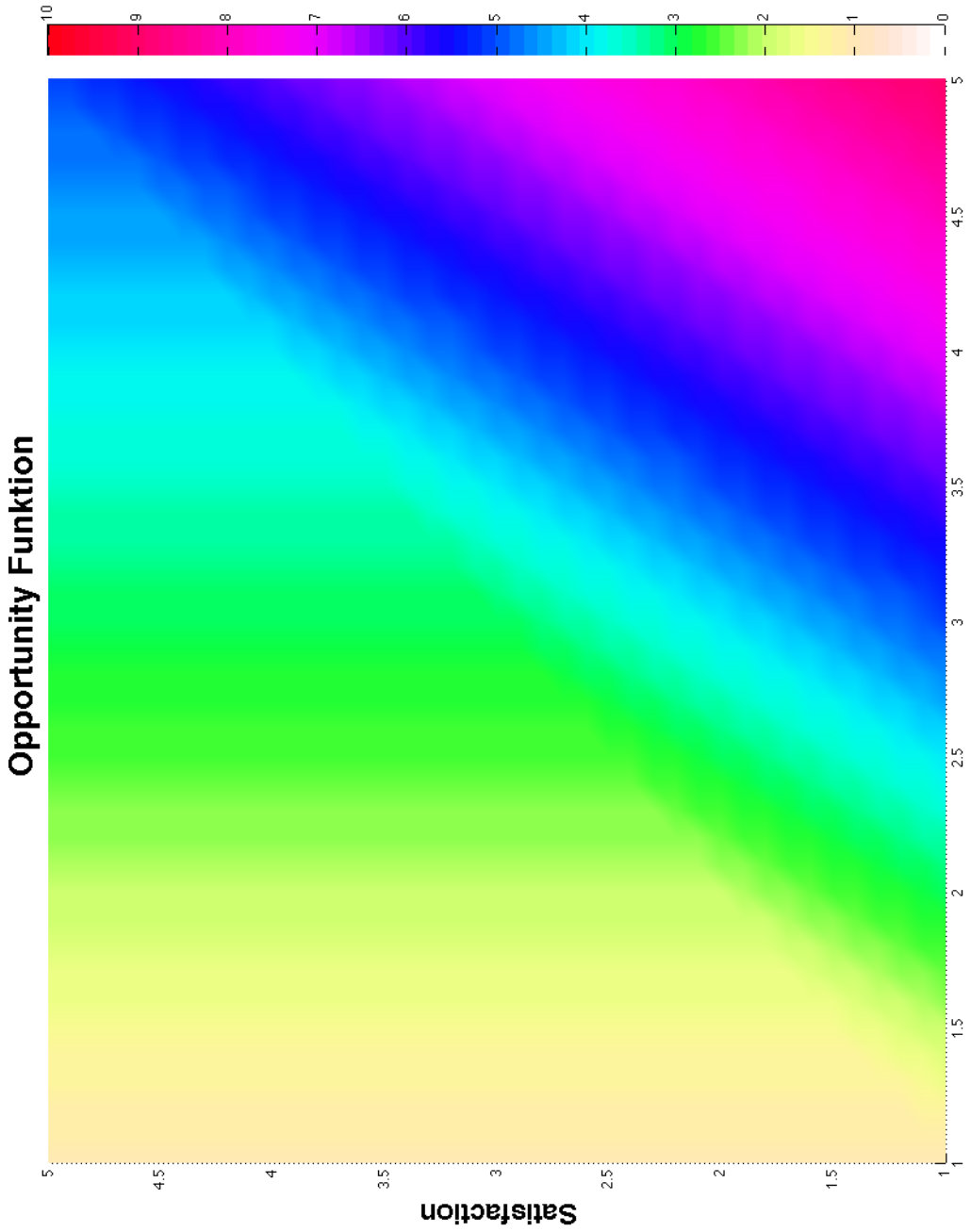
Graph A.29: Importance of an web configurator



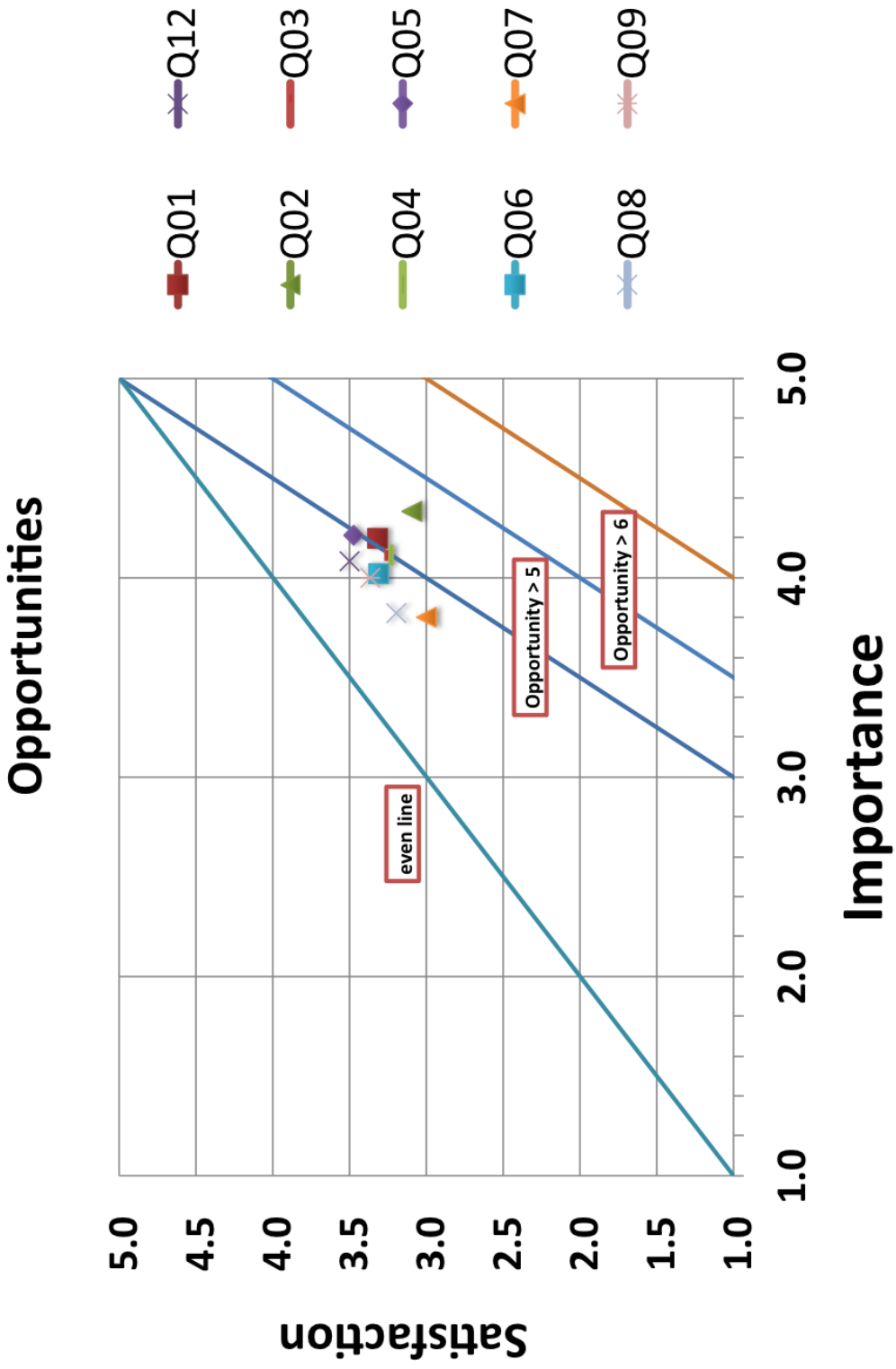
Graph A.30: Availability of a web configurator



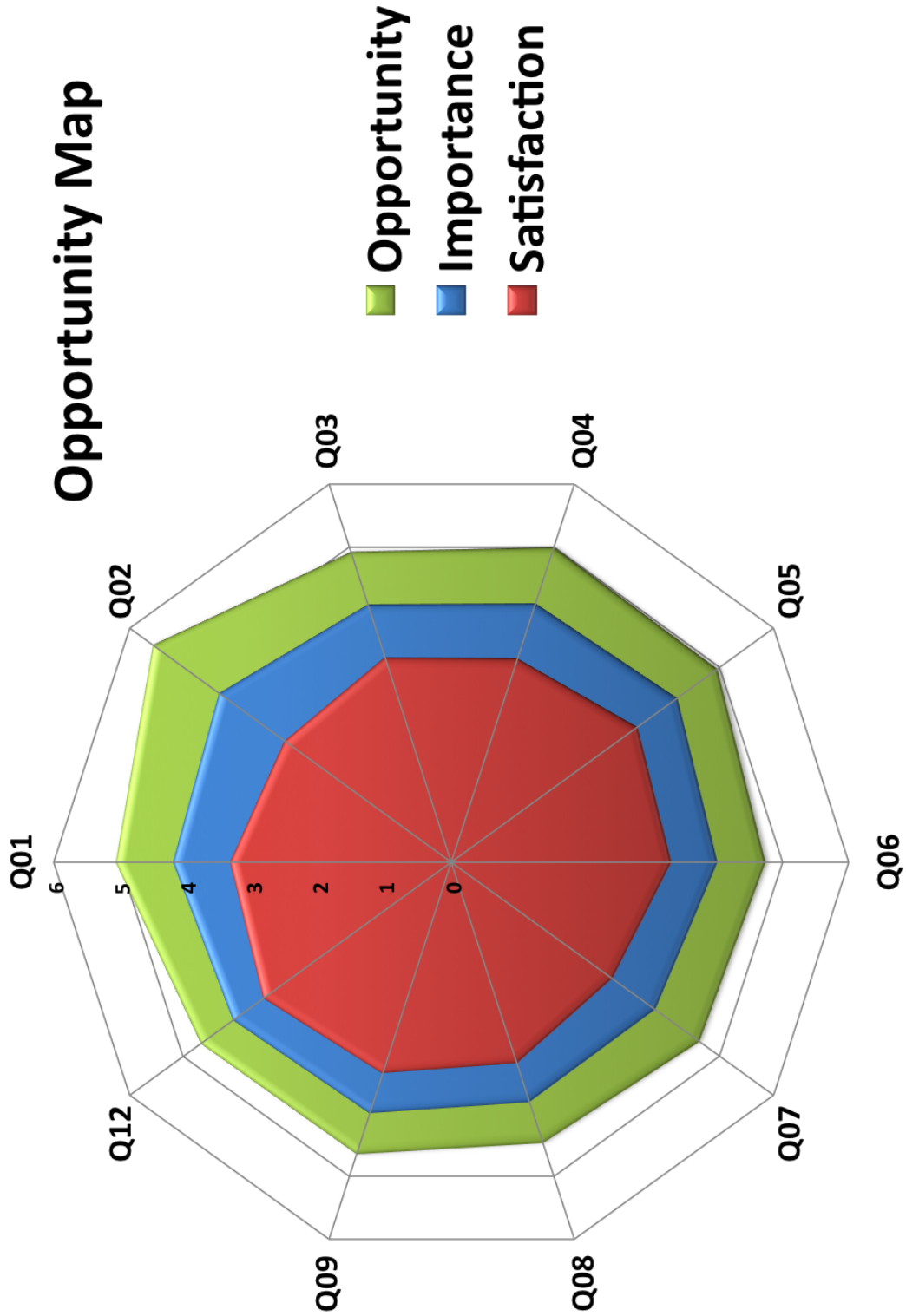
Graph A.31: Segmentation of customer



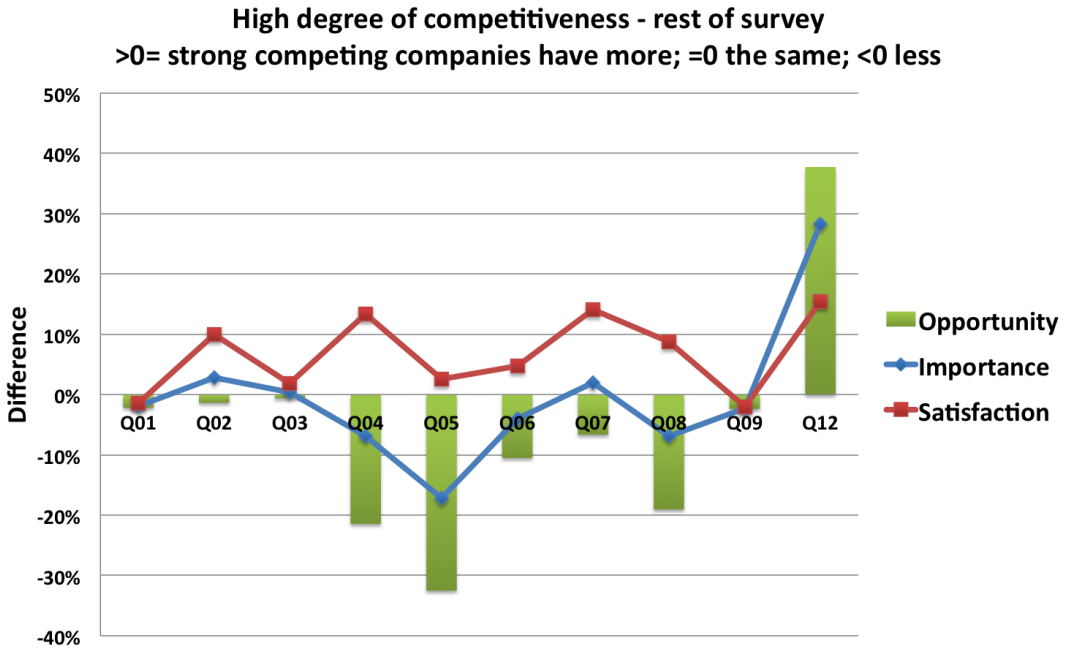
Graph A.32: Opportunity funktion



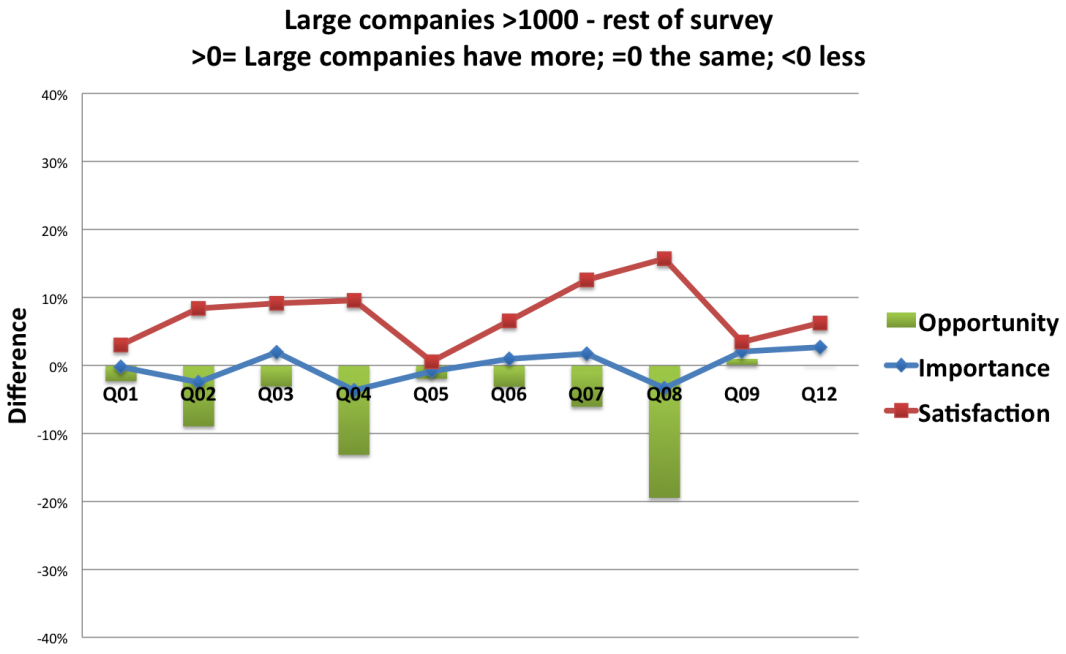
Graph A.33: Opportunity map



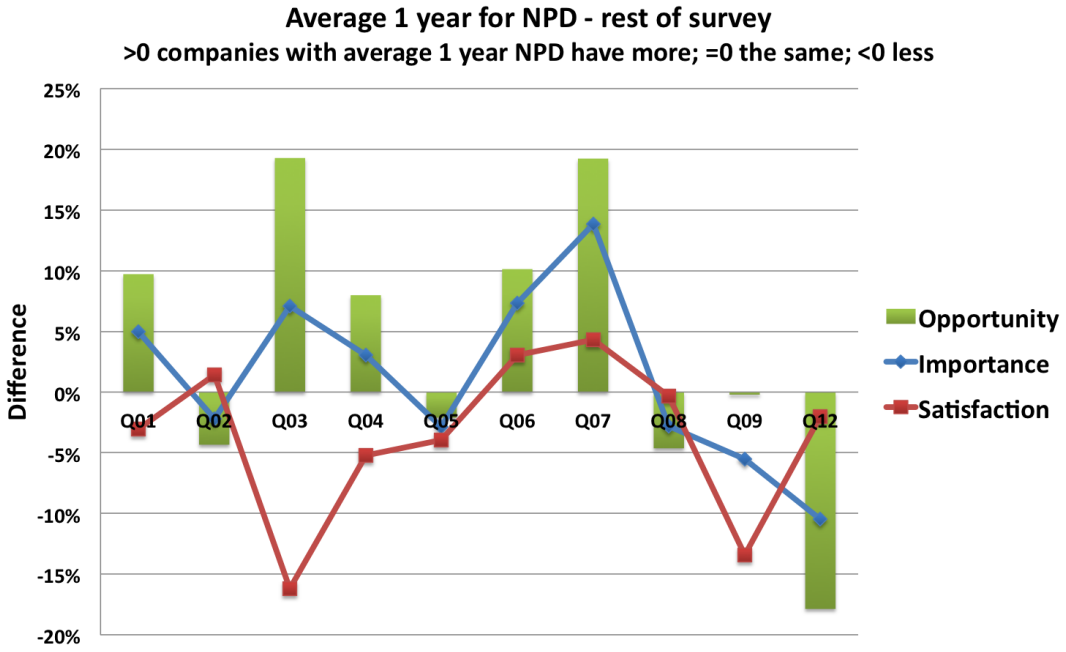
Graph A.34: Opportunity net



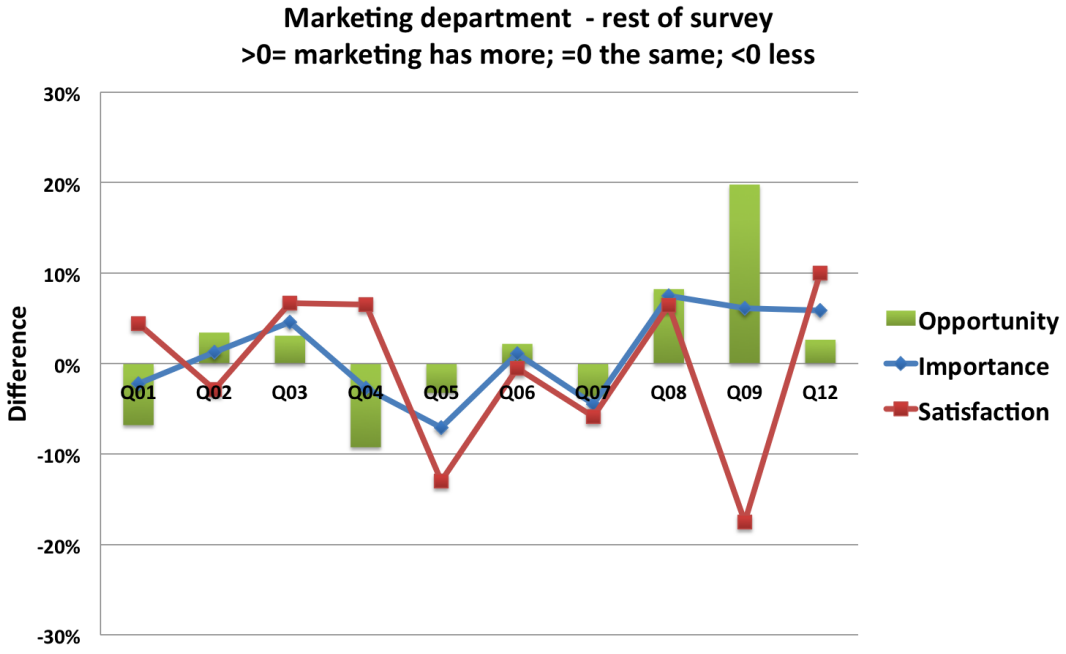
Graph A.35: Degree of competitiveness



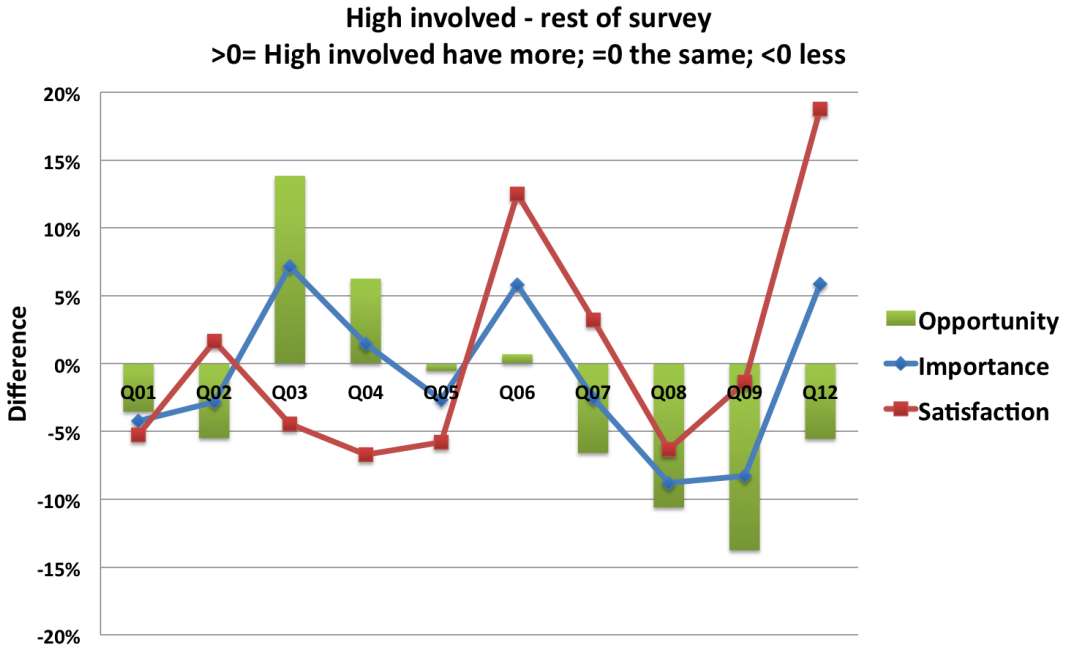
Graph A.36: Size or a company



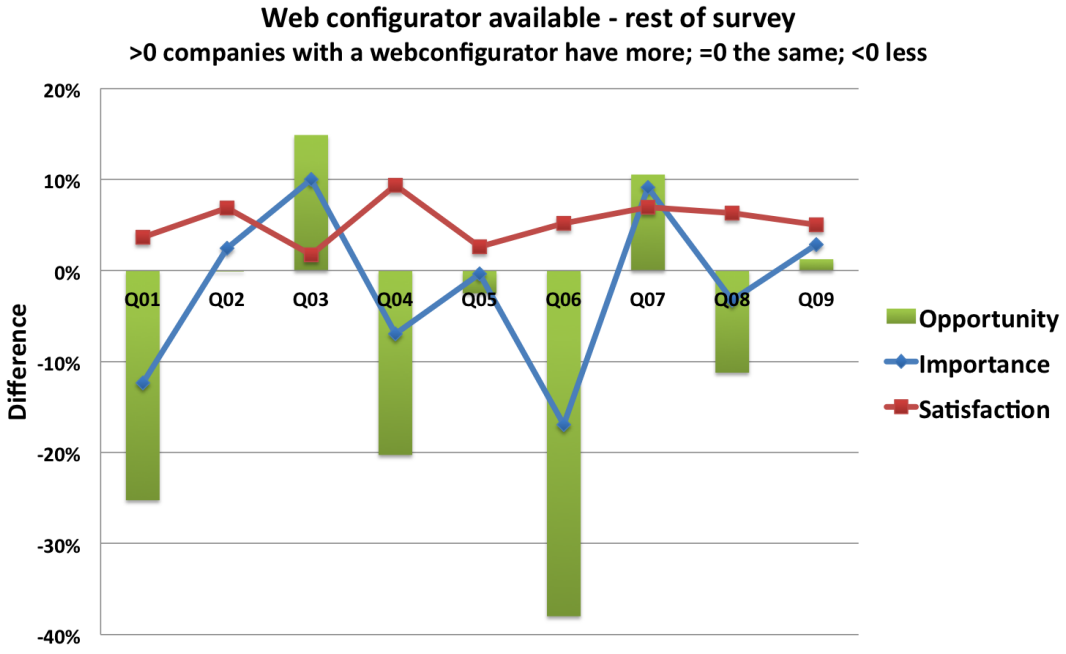
Graph A.37: Time to market



Graph A.38: Business unit



Graph A.39: Degree of involvement



Graph A.40: Existence of a web configurator

Appendix B

Workshop protocol

Independently of a workshop or an interview all participants have been asked the same questions, therefore the results are summarized together.

B.1 Customer segmentation

The participants were asked to describe the current established procedure for segmentation inside the company:

- The participants explained that the mobile telecommunication branch uses classical methods for segmentation, e.g. survey based.
- Currently the collected knowledge about the customers includes mainly information about demographical data, revenue and number of employees.
- The currently established procedure follows sometimes a contrary approach:
  - A product is developed and afterwards a market for the product is searched.
  - An example is the development of wired line SMS. This technology has been developed, independently of the needs of the customers.
- Based on the current knowledge about customers an allocation to the segment can be done with a probability of about 60%. In case that this value should be increased additional face-to-face interviews are necessary.
- A segmentation, which offers more information about the customers, is partly realized for the private sector. Customers have been clustered in

nine segments. Each segment was described by information about the environment, the behavior and their usage of mobile devices. Examples for those segments are the so-called "Penny Savers" or the "Message Junkies".

- To describe the segment more in detail, the environment including all brands and gadget have been investigated.
- The brands are important for customers. Some of their needs are directly related to specific brands.

The second question inside the segmentation block focused on the possibility to recognize a good segmentation:

- Emotional experiences should be included in the segmentation.
- Behavior at private customers is relevant but is not used monitored and used inside the company
- Behavior and needs of customer changes, therefore the segmentation has to be executed every 2 years.
- The creation of segments is based on qualitative data. A quantitative cross check is needed to get reliable results.
- A good segmentation in combination with a prediction model could enable up selling potential

Concerning the presented procedure, the strength and weaknesses are:

- The mindset for customer behavior oriented segmentation does not exist.
- The information to run such a procedure is currently not available inside a database.
- The monitoring of behavior is currently not easy to handle. The participants Segmentation could be used for NPD and product communication but not for cross & up selling
- Experience of customer is not in the focus of any idea creations. The transfer of this information is very valuable and important to increase the quality of the idea creation.
- With additional efforts it is possible to transfer the knowledge at the segmentation approach to other departments.

- The adoption of products is very hard. Therefore the information coming from such an approach could be used for the communication of selected product features, which satisfies some identified undeserved needs of specific segments.
- Currently there are two different main approaches:
  - One for standard products: Those are products, which generate the main part of the revenue. For those products only minor adoptions are possible.
  - The other one for on top products: Those are products, which are adoptable, for selected segments. The presented approach could be used for such products.
- Segmentation does not mean that the allocation of a customer to a segment is valid for all products therefore methods are needed to identify the needs of the customers, which cannot be communicated easily.

B.2 Customer needs

The participants were asked to describe the current company culture concerning product development:

- Currently mobile telecommunication companies are in a kind of an identity crisis:
  - The part of the value chain of mobile telecommunication companies reduces more and more to a bit pipe for applications.
  - Mobile operators are searching for a unique part of the value chain, which can be covered by them.
  - Therefore, they have a very low willingness for a high investment in any risky product developments
  - The research time for new product ideas is very short.
- Telecommunication company primarily search for quick wins and not for long term approaches. E.g. Telekom Austria does not search for any radical new innovation
- Companies in the telecommunication branch in Austria are usually risk averse. They have low trust in the competence of the customers:

  - Open platforms are not welcomed, due to the negative feedback of customers, which could harm the company.
  - Culture for negative feedback is currently established inside the company

In the second part the participants were asked to discuss established methods for the identification of customer needs:

- The method customer observation is used to observe the environment of the customers.
- Testing is established, but only for final adoptions not for product developments like focus groups and field trails
- Open Innovation is partly used inside the business segment with selected customers:
  - The selection of the partner depends on possible revenue stream.
  - Big customers have more power to fulfill their needs.
  - It is even more a co-creation then open innovation.
- Customer involvement is partly used for customer experience workshops at the department customer service and customer loyalty management.
- Some of the customer needs are covered in close cooperation with external solution partners. The job of the identification of the customer needs has to be done by the solution partner. Telekom Austria does only the deployment of developed a service.
- Early adopters are partly identifiable: A person is an early adopter for a specific topic. Nevertheless the company recruits this person for all other topics as well.

Concerning the presented procedure for the identification of the customer needs, the strength and weaknesses are:

- Customer observation is more suitable for:
  - the final check short before the product launch
  - the search of cost savings e.g. “Welcome Package”
  - the identification of latent needs

  - as input factor for methods like Lead User or Outcome Driven Innovation
  - the creation of the picture of the customer

- It is difficult to identify the needs of the customers.
- Outcome Driven Innovation as stand alone procedure is not sufficient. The method has to be combined and established as a process.
- The focus inside the company has to be set by the management.
- The main hurdles are money, time and resources.
- The identification of the needs is important for different departments and tasks inside the company.
- The method looks complicated. Therefore, trainings for all involved people must be executed.
- The collaboration of all involved departments must be ensured.
- The Lead User method alone is money, time and resources intensive. Therefore a follow up project is needed to work out the business plan.
- Product development takes a long time in case that product definition is too complicated. Market research is very difficult, which questions should be asked? Are the customers able to understand future products in case that no prototype is available?
- The quality is very important for a market leader. Therefore Telekom Austria has respect to launch products, which are not finalized completely
  - It depends on the product category, whether a public trial can be done. For example for security products, no public trial can be executed.
  - o Telekom Austria has no experience, but also no courage, to run a public trial.

B.3 Product customization

The participants were asked to evaluate the concept of individual product concept in general:

- Products should tell a story to the customers. They need to be tangible.
- There are companies which try this approach but return to standard products:
  - Standard products fit to 80% of the customers and those can be handled with 20% efforts. The other 20% need another 80% of efforts.
  - E.g. O2 in Germany tried individualized tariffs but customers didn't ask for such tariff models => has not been successful. The handling of the 20% of the customers needs a lot of resources.
- Customer should have the possibility to try out product variants.
- A different approach for product adoption is the personalization of products:
  - Put name of the service agent inside the phone => provides the customer a feeling that the device was done for him
  - Follow concept of car "Mini": Customers can select of several features, which are easy to handle for the company => selection of those features provides the feeling that the Mini is unique and especially for produces for the customer.

The web configurator is a core element to run a product customization approach. The statement concerning this element were:

- Ratings of customers are needed
- Recommendations are difficult at the beginning due to the necessity of customer behavior data.
- Recommendations of prominent persons and their selections are helpful.
- The web configurator asks too many questions. Individual explanations are needed, but this procedure could take too long.
- Danger to ask to much inside the web configurator => customers prefer an easy going solution. E.g.: Food restaurant offers to many different variations => customer do not understand the whole menu and reduces his interest in known food.

The statements concerning the possibility to adopt products are:

- Customers expect to be served by a full product.

- Mass of customers search for all-inclusive products, e.g. all inclusive travel packages.
- Recommendations of prominent persons and their selections are helpful.
- Too many offers could ask too much of the customers => this procedure does only suit to a special segment
  - Depends on the product
  - How much is the customer able to imagine a not existing product?
- Danger to ask to much inside the web configurator => customers prefer an easy going solution. E.g.: Food restaurant offers to many different variations => customer do not understand the whole menu and reduces his interest in known food.

The third question in the section focuses on the internal challenges of such an approach:

- Adoptions of products are partly possible for a couple of products
- The concept of mass customization is not transferable completely
- MC approach mainly fit for business customers => the products have to be created on a modular base
- Procedure suits to a segment, which provides an indicator for trends on the market
  - Based on derived trends => bundles of products can be built and offered for the mass market
  - Simultaneously, there is the danger that the segment does not lead a market trend
- The costs for all adoptions are very high, the complexity in the processes increases

B.4 General considerations

The last section focuses on the introduction of the model Innomization. Initial, the statements for the current established product development procedure are collected:

- Stage-Gate process at TA is more a tube then a funnel.
  - Courage to terminate ideas is missing.
  - Stage-Gate is more a defined procedure to share information then a selection process
  - High quality is more important and the main idea behind the current procedure.
  - Stage-Gate creates a lot of garbage, could be reduced by suggested model.
- Products are developed and not solutions for customers. The need of the customers is not investigated and therefore not in the focus of the development.
- Experts, who understand the market and who pushes ideas through the company processes, currently drive innovation.
- Innovation is currently done inside one specific issue e.g. elderly people.
- At Telekom Austria most of the task is outsourced. The competences to do those tasks by the company is often not possible due to the missing of the needed competences
  - Partners are responsible to run the customer needs oriented approach.
  - Telekom Austria does the deployment and handles the relationship based on the strong infrastructure.

The elements for an integration of the model are discussed:

- Shift of mindset is needed in whole company
- Elements of the procedure could be integrated into the whole current procedure at Telekom Austria
- Basically realizable but discipline and the support of the leader are necessary.
- During the product development procedure a lot of synchronization work is needed
- Model enables a higher quality in the output of the Stage-Gate and simultaneously it is faster than a traditional Stage-Gate due to the entrance into a later gate

  - The previous gates are more flexible and should be part of the daily work

- Comparison of the model with the Google approach
  - The collection of behavior of customer is relevant for the product development.
- Segmentation is point of departure for all following approaches
- Cost structure is relevant
- Mass customization for product bundles consisting of hardware, operating system, services, applications and tariffs. Customer will be consulted inside a store and receive a full prepared new mobile device after the procurement.
  - Will be adopted for each customer
  - OpCo is not hardware manufacturer => sells product bundles

The final part of the workshop and interviews focuses on the problems and the weaknesses of the model:

- Procedure is currently not applicable due to:
  - All steps have to be executed manually.
  - No communication between methods is established.
  - The needs of the customers are not in the focus.
- Model is very complex. Change in all departments is needed.
  - All interfaces are currently not defined.
- Innovation funnel needs high involvement of all participants.
  - Resources needed.
  - Different mindset => new company culture is prerequisite.
  - Mistakes have to be accepted.
- Competences in different departments are needed, which are currently not available.
- Process could take more time then current established procedure. Quality could be lower to the less time for integration.
- Contradiction: High speed and higher quality

Appendix C

Online survey

*** to increase text size use ['cmd' or 'strg' or 'ctrl' plus '+'] keys on your keyboard ***

Dear Interview Partner!

Thank you in advance for your time to do this interview!

This interview is a core element of the master thesis for the Entrepreneurship and Innovation MBA. The master thesis investigates the procedure of the development of new products.

The interview will take about 10 minutes.

Explanation:

For the following questions, check boxes with a valuation from **1 (worse)** and **5 (best)** are used.

E.g. if clustering of your customers is **very important** fill in a **5,** but **not very satisfying** fill in a **2.**

Clustering?					
	1 (worst)	2	3	4	5 (best)
Importance	○	○	○	○	◉
Satisfaction	○	◉	○	○	○

C.1 Information collection

Frage 1

Which information do you gather about your customers?

- ☐ Business or Residential
- ☐ Demographical data (Nr. of employees, years-in-business, sales volume, etc.)
- ☐ Geographical data (location)
- ☐ Psychographic (activities, interests, opinions)
- ☐ Revenue generated with the customer
- ☐ Customer lifetime
- ☐ Customer needs
- ☐ Behavior of the customer (Purchasing habits, Benefit, User status, Usage, etc.)
- ☐ Others (please use box) _____

Es können mehrere Items ausgewählt werden

Frage 2

How important is this information for you and how satisfied are you with the collected information?

	1	2	3	4	5
Importance	☐	☐	☐	☐	☐
Satisfaction	☐	☐	☐	☐	☐

Innomization [Innovation & Customization]

Frage 3

How do you collect customer data?

- ☐ Market research
- ☐ Data warehouse
- ☐ Sales feedback
- ☐ IT based methods (e.g. cookies)
- ☐ Others (please use box) _____

Es können mehrere Items ausgewählt werden

Frage 4

How important is/are this method(s) for you and how satisfied are you with the established procedure?

	1	2	3	4	5
Importance	☐	☐	☐	☐	☐
Satisfaction	☐	☐	☐	☐	☐

Frage 5

Do you segment your customers?

- ☐ Yes
- ☐ No

Bitte nur ein Item auswählen

Frage 6

What kind of statistical methods do you use for your segmentation?

- ☐ Cluster analysis
- ☐ RFM (Recency, Frequency, Monetary Value)
- ☐ ANN (Artificial Neural Network)
- ☐ Machine Learning
- ☐ Regression
- ☐ Decision Trees
- ☐ Others (please use box) _____
- ☐ Do not know

Es können mehrere Items ausgewählt werden

Frage 7

How important is/are this procedure(s) for you and how satisfied are you with the outcome?

	1	2	3	4	5
Importance	☐	☐	☐	☐	☐
Satisfaction	☐	☐	☐	☐	☐

Frage 8

How often do you update your segmentation results?

- ☐ less than every two years
- ☐ every two years
- ☐ every year
- ☐ two times a year
- ☐ more than two times a years

Bitte nur ein Item auswählen

Frage 9

How important and how satisfying is this update cycle for you?

	1	2	3	4	5
Importance	☐	☐	☐	☐	☐
Satisfaction	☐	☐	☐	☐	☐

C.2 Idea generation & evaluation

Frage 10

How do you support the creation of ideas in your company?

- ☐ Fairs, Congresses, etc.
- ☐ External and internal workshops/trainings (suppliers, partners, etc.)
- ☐ Discussions with customers
- ☐ Others (please use box) _____

Es können mehrere Items ausgewählt werden

Frage 11

How important is/are this method(s) for you and how satisfied are you with the outcome?

	1	2	3	4	5
Importance	☐	☐	☐	☐	☐
Satisfaction	☐	☐	☐	☐	☐

Frage 12

How do you involve the customers into the idea evaluation procedure?

- ☐ Not at all
- ☐ Unstructured (via Sales channels, Email, etc)
- ☐ Web Portal
- ☐ Focus groups
- ☐ Beta testing
- ☐ Customer Service (Complaint management, Product hotline)
- ☐ Others (please use box) _____

Es können mehrere Items ausgewählt werden

Frage 13

How important is/are this method(s) for you and how satisfied are you with the outcome?

	1	2	3	4	5
Importance	☐	☐	☐	☐	☐
Satisfaction	☐	☐	☐	☐	☐

C.3 Innovation process

Frage 14

How is the innovation process structured within your company?

- ☐ Stage Gate Process
- ☐ Innovation Methods
- ☐ Project oriented
- ☐ No structure
- ☐ Others (please use box) _____

Es können mehrere Items ausgewählt werden

Frage 15

How important is/are this process(es) for you and how satisfied are you with the established procedure?

	1	2	3	4	5
Importance	☐	☐	☐	☐	☐
Satisfaction	☐	☐	☐	☐	☐

Frage 16

Which innovation methods are established in the company?

- ☐ Creativity Tools
- ☐ Customer involvement e.g. focus groups
- ☐ Mass Customization
- ☐ Open Innovation approaches with partner / competitor
- ☐ User Driven Innovation (Lead User,...)
- ☐ Quality Function Deployment
- ☐ Customer observation
- ☐ Web Based Open Innovation (Online Communities)
- ☐ Others (please use box) _____

Es können mehrere Items ausgewählt werden

Frage 17

How important is/are this method(s) for you and how satisfied are you with the established procedure?

	1	2	3	4	5
Importance	☐	☐	☐	☐	☐
Satisfaction	☐	☐	☐	☐	☐

C.4 Product customization

Frage 18

How much are you able to adopt your products due to the needs of customers?

- ☐ Products can be adopted individually
- ☐ Products adoptions depends on the requirements
- ☐ Products can be adopted based on individual offers but results in high costs for the customer
- ☐ None at all
- ☐ Others (please use box) _____

Es können mehrere Items ausgewählt werden

Frage 19

How important is it for you and how satisfied are you with the possibility to adopt your products?

	1	2	3	4	5
Importance	☐	☐	☐	☐	☐
Satisfaction	☐	☐	☐	☐	☐

Frage 20

Do you have a web based application which enables the customer to adopt your products?

- ☐ Yes
- ☐ No

Bitte nur ein Item auswählen

Frage 21

Can you imagine to offer a web-based application as a product configurator?

- ☐ Yes, without any limitations
- ☐ Yes, but limited to standard features
- ☐ No
- ☐ Other (please use box) _____

Bitte nur ein Item auswählen

Frage 22

How important would be a web based configurator for you?

	1	2	3	4	5
Importance	☐	☐	☐	☐	☐

Frage 23

Which possibilities do your customers have in adopting a product with a web configurator?

- ☐ Customer can change everything inside the product (full flexibility)
- ☐ Customer can change the main parameter of the product
- ☐ Products are structured in modules, which can be changed by the customer
- ☐ Only specific parameters of the product can be adopted by the customer
- ☐ Customer is not allowed to change anything

Bitte nur ein Item auswählen

Frage 24

How important is it for you and how satisfied are you with the possibility for customers to adopt your products?

	1	2	3	4	5
Importance	☐	☐	☐	☐	☐
Satisfaction	☐	☐	☐	☐	☐

Frage 25

Can you please describe the main advantages of your established innovation procedure?

A:

Frage 26

Can you please describe the main disadvantages of your established innovation procedure?

A:

C.5 General related question

Frage 27

Which industry do you belong to?

- ☐ Accounting
- ☐ Advertising
- ☐ Aerospace
- ☐ Agriculture
- ☐ Aircraft
- ☐ Airline
- ☐ Apparel & Accessories
- ☐ Automotive
- ☐ Banking
- ☐ Biotechnology
- ☐ Broadcasting
- ☐ Brokerage
- ☐ Call Centers
- ☐ Chemical
- ☐ Computer
- ☐ Consulting
- ☐ Consumer Products
- ☐ Cosmetics
- ☐ Defense
- ☐ Department Stores
- ☐ Education
- ☐ Electronics
- ☐ Energy
- ☐ Entertainment & Leisure
- ☐ Executive Search
- ☐ Financial Services
- ☐ Food, Beverage & Tobacco
- ☐ Grocery
- ☐ Health Care
- ☐ Internet Publishing
- ☐ Investment Banking
- ☐ Legal
- ☐ Manufacturing
- ☐ Motion Picture & Video
- ☐ Music
- ☐ Newspaper Publishers
- ☐ Online Auctions
- ☐ Pension Funds
- ☐ Pharmaceuticals
- ☐ Private Equity
- ☐ Publishing
- ☐ Real Estate
- ☐ Retail & Wholesale
- ☐ Securities & Commodity Exchanges
- ☐ Service
- ☐ Soap & Detergent
- ☐ Software
- ☐ Sports
- ☐ Technology
- ☐ Telecommunications
- ☐ Television
- ☐ Transportation
- ☐ Venture Capital
- ☐ Other (please use box)

Bitte nur ein Item auswählen

Frage 28

Other industry *)

A:

Frage 29

How competitive is your industry?

- ☐ Highly competitive market
- ☐ Competitive market
- ☐ Slight competition

Bitte nur ein Item auswählen

Frage 30

Numbers of employees?

- ☐ 0-10
- ☐ 11-25
- ☐ 26-50
- ☐ 51-100
- ☐ 101-500
- ☐ 501-1000
- ☐ >1000

Bitte nur ein Item auswählen

Frage 31

Which departments are currently involved in the product development process?

- ☐ Marketing
- ☐ R&D
- ☐ Customer Service
- ☐ IT
- ☐ Sales
- ☐ Business Development
- ☐ Others (please use box) _____

Es können mehrere Items ausgewählt werden

Frage 32

On average, how long does it take to launch a new product [in months]?

- ☐ ≤1
- ☐ >1≤3
- ☐ >3≤6
- ☐ >6≤12
- ☐ >12≤18
- ☐ >18

Bitte nur ein Item auswählen

Frage 33

Which department do you belong to?

- ☐ Marketing
- ☐ R&D
- ☐ Customer Service
- ☐ IT
- ☐ Sales
- ☐ Business Development
- ☐ Other (use box) _____

Bitte nur ein Item auswählen

Frage 34

In which role do you currently participate to the innovation process?

- ☐ High involvement (project owner)
- ☐ Managing the overall process (process owner)
- ☐ Bringing in of ideas
- ☐ no involvement
- ☐ Others (please use box) _____

Bitte nur ein Item auswählen

Dear Interview Partner!

Thank you for participating in this survey!

The Author

Below there is a link to a video of Harvard Professor Clayton Christensen describing the approach to identify the customer needs.

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