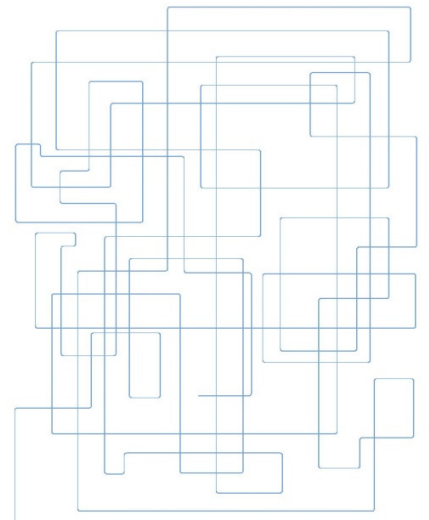
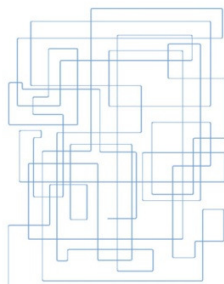
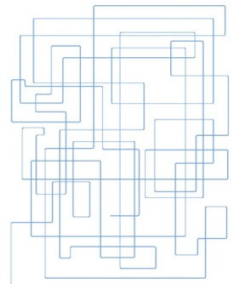




Customer analytics as a source of competitive advantage

Master thesis

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EXECUTIVE SUMMARY

Deregulations, visibility of information over Internet and globalization are widely considered to be positive things, which trigger fast pace of economic development for the modern society. However, in many cases, exactly for the same reason, they destroy competitive advantage and companies start searching for opportunities to gain it. Taking into account increased information processing power and amount of collected data over the last couple of decades, companies are considering if it is worth to invest in customer analytics to gain competitive advantage. Therefore, the business world is questioning an ability of customer analytics to provide competitive advantage. Moreover, a sustainability of such an advantage is also questioned.

In this thesis the resource-based view was applied to five cases to analyze how exactly customer analytics contributes to competitive advantage. The system theory was used to analyze the differences in a context where a technology is applied in order to analyze compatibility between organization resources and technology. In addition, a survey on customer analytics was studied to find a relationship between improved performance (across dimensions as: sales growth, time to market and customer retention) and analytical capability.

Customer analytics can contribute to competitive advantage across three dimensions: increased bargaining power, improved effectiveness and improved efficiency of marketing capability. However, a sustainability of this advantage with analytics is doubtful. If analytics is complemented with other unique resources of the company such as scale advantage or access to unique data, then it is sustainable. Case studies suggest that each step of maturity requires more and more intangible organizational resources. So that if benefits from analytics were increasing with maturity, then the company which is able to innovate fast with analytics would sustain an advantage. However, this is not the case. The results show that sales improvement diminishes with analytics maturity over time. The decrease of perceived sales expansion might refer to the fact that there is a limit of the ability of the market and the company to grow at some point. Time to market improvement does not correlate significant with maturity (except for public services). This could be explained by a different perception to what it relates to. Profit-making organizations tend to associate time to market with products that bring profits and they tend to exclude extra services (e.g. information availability on their website). In addition, retention is improving with analytics maturity for products, public services and resource industries. The insignificance of financial services could be explained by the nature of the business and the level of regulation.

Another interesting finding concerns the relationship between data driven decision making and soft driven decision making (e.g. intuition and experience). There is a significant positive correlation between data driven decision making and soft driven decision making. It rejects an existence of the scientific literature assumption that data driven decision making leads to decrease of soft driven decision making.

The survey part of this research was limited to only three outcome variables: retention, time to market and sales improvement. The future research should also investigate the impact of maturity on other outcome variables such as cost improvement, process innovation, organization innovation, etc. Moreover, more case studies should be conducted where analytics is applied for pricing such as the airline industry. Also more research should be conducted in industries, where the company has no direct link with a consumer.

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Chapter 1. INTRODUCTION

1.1 Background

The competition is getting more intense due to deregulation, slow-growth industries and globalization. Intense competition and more demanding customers push companies to search for new ways to obtain competitive advantage. However, the capacity of product innovation and quality to provide the basis for competitive advantage has depleted (Woodruff, 1997). Furthermore, patents do not help to protect innovation. The most current example is a patent war between Samsung and Apple. Apple is suing Samsung for infringement of patents relating to touch screen interfaces. In the same time, Samsung is suing Apple for the violation of 3G (mobile telecommunication) patents. In addition, breakthrough innovations are very difficult to achieve (Davenport and Harris, 2007). Therefore companies have turned their attention at redesigning organizational processes to improve performance. However, a lot of organizations that conduct such reorganizations do not achieve the dramatic improvements they are looking for (Hammer and Champy, 1993). Consequently, the search for advantage over the competitors continues.

Organizations have turned their attention at increasing customer value in order to achieve competitive advantage (Woodruff, 1997). As a result, companies are switching slowly from product-oriented way of doing business towards market-orientated business. Jaworski and Kohli (1993) have found a positive relationship between market orientation and organizational performance. Market orientation has become the new differentiator in today's business world (Alvarez et al., 2006). However, the question is still open on how organizations should compete on customer value delivery (Woodruff, 1997). In order to deliver the value to the customer Woodruff suggests that organizations first must gain knowledge about their markets and current customers and are then able to translate this knowledge into action. Analytics technology promises to deliver exactly this knowledge about a customer. Analytical packages help to discover patterns, find predictors and apply different statistical techniques on large amount of data.

1.2 Rationale behind the research

The current master thesis explores a potential value of Customer Analytics (CA) to contribute to competitive advantage as it provides an insight on how to maximize an extracted value from this technology.

Investments in IT alone do not increase productivity, but they might enable an organizational change that improves performance (Brynjolfsson and Hitt, 1998, Powell and Dent-Micallef, 1997). Therefore, this thesis analyzes the value of analytics not as a standalone technology, but as an enabler of changes in market processes such as sales, channel management, product development, marketing planning, marketing implementation and pricing.

A big amount of literature on critical success factors of IT adoption suggests an existence of a critical set of resources and capabilities that are required to deploy IT. However, even if a company possesses critical resources and capabilities, it does not mean that it is able to extract the value from IT to its maximum. The

extent to which IT provides value depends on the availability of complementary organizational resources and capabilities (Melville et al., 2004). In order to reap benefits from CA to a maximum extent, organizations should possess or develop complementary to CA resources and capabilities. The difference between an “ideal” and existing set of complementarities is called the degree of compatibility throughout the research. Moreover, taking into account that different IT systems require a different degree of organizational change (Zand, 2011), the complementarities are not unified for different IT systems and the specific for CA complementarities need to be taken into account. In this paper resources and capabilities complementary to CA are identified.

Furthermore, due to the difference in resources and capabilities that companies possess, it is argued that some companies initially would be more compatible with CA than others. Due to the fact that some complements are critical for technology adoption and some are not, companies might also choose not to integrate a full spectrum of complements. In this paper the consequences of such choice for a CA adoption are studied.

1.3 Research question

This research paper is trying to clarify how customer analytics delivers competitive advantage and also tries to spot possibilities on how this advantage could be sustained. Moreover, complementarities are considered as enablers of analytics success. Therefore, the research question can be formulated as follows:

Does Customer Analytics contribute to competitive advantage?

If yes, through which mechanisms?

If not, why not? What are the barriers to achieve competitive advantage with CA?

In order to help answering the main research question, a set of sub-questions is as follows:

- What are the basic mechanisms through which competitive advantage is achieved? (desk research)
- What are the complementarities to adoption of customer analytics? (desk research)
- What is the potential value of customer analytics? (desk research)
- Does empirical evidence validate or reject the developed model? (survey, cases)

1.4 Scientific relevance of the research

The underlying mechanisms of achievement of organizational benefits with IT assets are not well understood and getting more understanding about it should be on the Information Systems (IS) research agenda (Melville et al., 2004, Nevo and Wade, 2008, Bharadwaj, 2000). The current research contributes to scientific knowledge by gaining more insight on the process of the achievement of organizational benefits with analytics technology in application to customer data.

It can be argued that an extensive body of knowledge is accumulated on the topic of CRM, where analytics is a core technology. However, a recent literature review on the CRM topic of Wahlberg et al. (2009) suggests that more research should be conducted that applies resource-based view (RBV) in the CRM field. The current study adopts RBV that elaborates on the characteristics of resources and

capabilities, which lead to a sustainable advantage over competitors. However, it has also a number of limitations. First of all, the theory does not explain the mechanisms of how the resources and capabilities lead to competitive advantage (Priem and Butler, 2001). Secondly, RBV does not value the synergy component among resource combinations (e.g. an organizational resource with an IT resource) in achieving competitive advantage (Kraaijenbrink et al., 2010). Also it does not consider assets that do not create competitive advantage by themselves (Nevo and Wade, 2010). In order to overcome these limitations, Nevo and Wade (2010) suggest to combine RBV with Systems Theory. This research is one of the first that is grounded on this new combined theory.

In addition, this research has got a unique opportunity to conduct studies on 3 out of 4 major Dutch banks. This provides a possibility to compare their analytics deployment with their competitive position in the local Dutch market. Also the current research utilizes a unique access to the survey data on customer analytics applications within large enterprises.

1.5 Practical relevance of the research

Nowadays a lot of companies consider if analytics technology is worth to invest in. Large companies have a lot of IT systems and often a high level of investments has to be made in order to extract data from them to a centralized storage in order to create a single version of 'truth'. Moreover, investments into other resources have to be done in order to use analytics effectively. Therefore, more clarity is necessary on how this technology provides a competitive advantage in order to be able to make an informed decision to invest in this technology in the phase of early adoption or to use a wait-and-see strategy.

The current research was conducted on request of the strategy department of an IT consultancy firm (Accenture). There are a number of reasons that makes the company interested in conducting this kind of research. First of all, analytics is a part of the company's technology vision. Secondly, this technology is relatively new to the company; therefore, there is a need to gather more information about use practices within companies. Thirdly, the IT strategy department has to develop a vision and a maturity model on the usages of this technology. Therefore, the department wants to obtain more knowledge about this technology in order to be able to provide good consulting services to IT executives and decision makers.

1.6 Project timeline

The project was conducted during an internship at Accenture. At first, a topic had to be found that would match interests of Accenture, feasibility of a research method, and the requirements of Master Thesis. A desk research was performed to identify a couple of potential topics. The topic "an organizational change that is needed to reap benefits from Analytics" seems to match the requirements mentioned above. However, it appeared to be difficult to find sufficient number of cases for this topic. The situation was worsened by the fact that the search for cases was conducted from a department, which was not primarily involved in analytics-related projects.

It has appeared that the most known cases within Accenture on the application of analytics were in the area of customer relationships. Therefore, in May the research was de-scoped to concentrate specifically on the application of analytics for customer processes. However, it appeared to be difficult to arrange more than one interview within one company. In addition, in July a survey on customer analytics usages, conducted on behalf of Accenture, was found on internet. The decision was taken to include an analysis of the survey in a scope of research to compensate for the low reliability of the case studies. The Gant chart of the project can be seen on Figure 1-1.

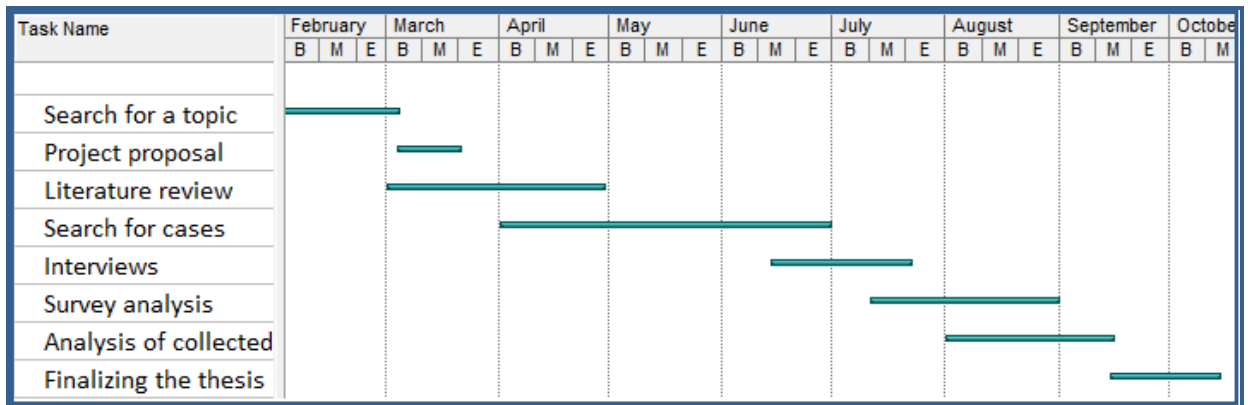


Figure 1-1 Gant chart of the project

In addition, I would like to note practical things, which have popped up unexpectedly during the research: sensitivity of information, lack of time, undervalued treatment of the research as being a student, ongoing sales process between Accenture and a possible case company. The latter sets a major limitation to contact these companies by a student. All of them shall be considered in advance by future graduate students that are starting their thesis.

1.7 Report outline

This research report consists of seven chapters. Figure 1-2 demonstrates visually the research flow. In order to shape the research, a theoretical lens is first outlined in Chapter 2. Then the literature is reviewed on mechanisms of competitive advantage achievement (see Chapter 2.2). Barriers to erosion of competitive advantage are reviewed in Chapter 2.3. After that, in Chapter 2.4, complementarity literature is reviewed to identify dimensions of compatibility between technology adoption and an organization. In Chapter 3.1 an analytical domain is outlined to get a deeper understanding on what analytics is. Further, marketing and customer relationship management literature is reviewed to identify dimensions of potential synergy between customer analytics and organizational resources. Based on Chapter 2 and 3, in Chapter 4 a conceptual model is formulated and a research methodology is discussed. In Chapter 5 (case studies) and 6 (quantitative analysis) empirical evidence is analyzed to reject or accept the in Chapter 4.1 formulated hypotheses. Drawing on empirical evidence, Chapter 7 is summarizing major findings and discusses the results. Limitations and suggestions for the future research are given in Chapter 8.

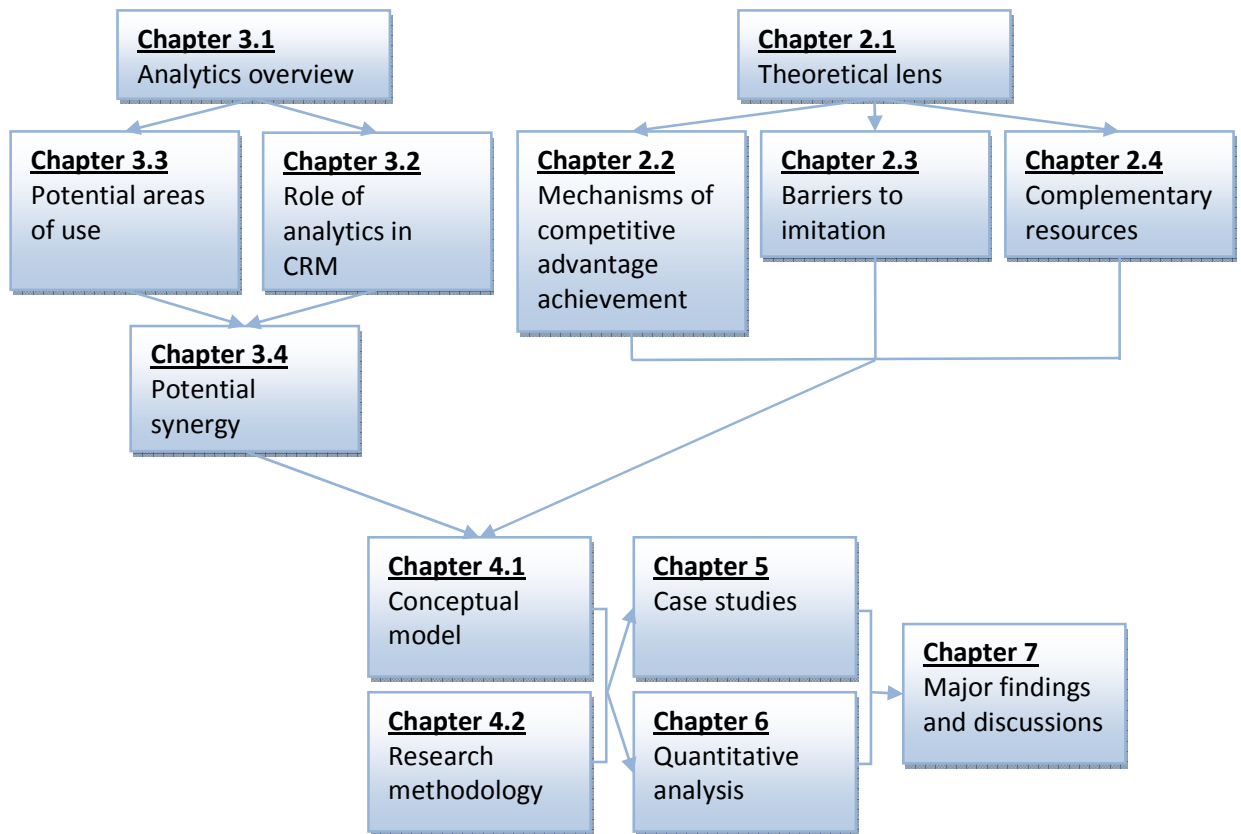


Figure 1-2 Research outline

Chapter 2. LITERATURE REVIEW

2.1 Theoretical lens

The research world for a long time tried to investigate how information systems could be used effectively to provide a competitive advantage. “Structure-Conduct-Perform” paradigm of industrial organizational economics in 80s was the most dominant one. This paradigm states that IT-enabled competitive advantage could be achieved if IT is used to manipulate industry variables, such as increasing entry barriers, weakening suppliers and buyers bargaining power over a company, etc (Porter, 1985). The limitation of this paradigm is that it assumes that organizational resources are mobile and homogeneous. However, with the emergence of the resource-based view (RBV) this assumption was questioned. Empirical evidence suggests that the effects of firm-specific resources on performance can be significant (Mahoney and Pandian, 1992). According to RBV, an organization is a bundle of resources and capabilities that are hard to copy, and that performance differences stems from differences in resources. The current study adopts RBV approach, because the main interest stems from a difference in resource configurations between organizations.

2.1.1 Resource-based View of the firm

Chamberlin (1933) and Robinsons (1933) were the first ones to recognize the fact that a firm heterogeneity is driving imperfect competition. Later on, some authors suggested that this heterogeneity stems from differences in resources that organizations possess (Penrose, 1959). Following the logic of these works, Barney (1991) has formulated the resource-based theory.

According to the resource-base view (RBV), a company owns the resources which help to achieve *competitive advantage* or superior long-term performance (Barney, 1991). An organization has competitive advantage when it is engaged in activities that increase the efficiency or the effectiveness and that are not being implemented by its competitors. This competitive advantage is called *sustained* if an organization’s competitors are not able to duplicate the strategy.

The theory suggests that the firms differ in the resources they have and this difference remain over time (Barney, 1991). A resource is anything tangible or intangible a firm can use (Radhakrishnan et al., 2008), whereas capabilities are abilities to absorb and apply the resources (Barney, 2002). RBV argues that not all resources are strategically relevant. The view considers that resources can provide *sustainable competitive advantage* if they are rare, inimitable, valuable and non-substitutable (VRIN conditions) and an organization is able to absorb and apply them (capabilities) (Barney, 1991, Barney, 2002).

Resource-Based View in Information Systems research

Information systems have been considered from the resource-based angle for a long time. The research world concluded that an IT asset itself fails to satisfy VRIN conditions (Mata et al., 1995), which means that it cannot be classified as the one that can provide sustained competitive advantage (Barney, 1991).

Therefore most of the research has concentrated its efforts on exploration of the IT management capabilities which could provide sustained competitive advantage. Moreover, even though IT by itself does not create sustainable competitive advantage, if it is combined with an organizational resource that satisfies VRIN conditions, it is possible to sustain competitive advantage enabled by IT (Brynjolfsson and Hitt, 1998, Radhakrishnan et al., 2008). Also the new stream of research combining RBV with Systems Theory suggests that IT assets cannot be considered in isolation. IT assets in synergy with existing organizational resources and capabilities create new or improved organizational resources. Nevo and Wade (2010) call to study these synergies to understand an impact and value of IT assets (Nevo and Wade, 2010). This view is in line with the process-oriented view of IT value creation, which suggests that IT impacts organizational resources and capabilities indirectly at the business process level which leads to improvements (Radhakrishnan et al., 2008, Mooney et al., 1996).

Resource-based view critique

Even though the resource-based view is a generally accepted way to study IS organizational resources and capabilities and how they create the business value, the approach has its drawbacks. A first criticism is that the theory does not provide an explanation on the process of how sustained competitive advantage is achieved with resources (Priem and Butler, 2001). The other criticism is that sustainable competitive advantage is not achievable and the firm must constantly change its resources and capabilities with only temporal advantage achievement (Fiol, 2001). This argument was discarded due to the fact that even though competitive advantage cannot be sustained for a long period of time, the focus on achieving it remains useful (Kraaijenbrink et al., 2010). The third criticism is that RBV does not value the synergy component among resource combinations (e.g. an organizational resource with an IT resource) in achieving competitive advantage (Kraaijenbrink et al., 2010) and that it does not consider assets, which do not create competitive advantage by themselves (Nevo and Wade, 2010). In order to overcome this criticisms Nevo and Wade (Nevo and Wade, 2010) have suggested to combine systems theory and resource-based view.

2.1.2 Systems Theory

In order to explore Systems Theory, some concepts should be defined first. According to the systems theory, the world consists of *things*, which in turn can be described by the set of *properties* they possess. Each property has a value, which might change over time and the particular value in a particular point in time can be defined as a state of the property (Nevo and Wade, 2010).

System theory suggests that *systems* consist of other *things* and they are *things* by themselves. A *thing* might be a system by itself or a basic element. System properties might be of two natures: some properties belong to the components of the system, but a new value is assigned to them; the other properties are radically new properties and their existence stems from *relationships* between the components of the system (Nevo and Wade, 2010, Ackoff, 1960, Kast and Rosenzweig, 1981).

The system theory suggests that the components are not isolated and they might interact. From this interaction the new or modified properties arise. Moreover, the *synergy* (positive emergent capabilities) between the children *things* of the subsystem might rise to the system itself, which will have a positive impact on the overall performance (Nevo and Wade, 2010).

2.1.3 Systems Theory and Resource-Based View

The combination of an IT asset and an organizational resource has a certain potential level of the synergy. The synergy exists not only on the level of a resource to which it is applied, but also on all levels, up to the system level. IT changes the subsystem of an organizational resource and the change influences all synergies on all levels among subsystems and resources up to the system level. So that in order to understand how IT influences firm performance, its impact should be tracked from an organizational resource to the system level. Two important enablers of realized synergy should be considered: *compatibility* and *integration* between an IT asset and an organizational resource. Figure 2-1 demonstrates combination of the System Theory and RBV as a lens to understand the IT value creation process.

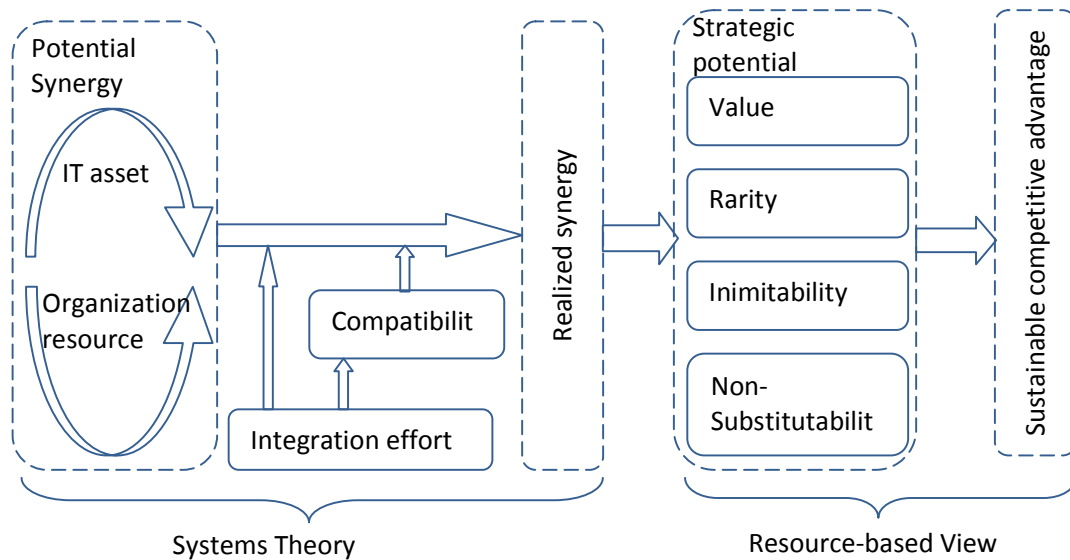


Figure 2-1 IT asset value creation process (Nevo and Wade, 2010)

In general, components are considered to be compatible if certain properties are in alignment or match. Compatibility of an IT asset with an organizational resource is the degree to which an IT asset is perceived to be compatible with existing values, needs, working routines and past experience of an organizational resource (Moore and Benbasat, 1991, Nevo and Wade, 2010). Moreover, a lot of studies suggested that different type of information technology might have a different degree of impact on an organization (McKeown and Philip, 2003, Venkatraman, 1994, Zand, 2011). That means that each IT asset has a different level of compatibility with an organizational resource. In case if an IT asset and organizational resource must be modified to a great extent before interaction can begin, then they are considered to be incompatible.

System Theory elaborates on the synergies between an organizational resource and an IT asset. When an IT asset and an organizational resource are compatible and integrated, potential synergy is realized and positive emergent capabilities arise (Nevo and Wade, 2010). System theory does not elaborate on the link between these positive emergent capabilities and firm performance; therefore, combination with RBV is needed. The theories are compatible in terms of unit of analysis. According to the System Theory functional departments are subsystems (Nevo and Wade, 2010) within an organization as a system, while The resource-based view sees organization as a bundle of organizational resources with capabilities. However, only the System Theory elaborates on relationships (interactions) between subsystems (resources) (Nevo and Wade, 2010). And only the resource-based view provides a link between an IT asset and firm performance.

2.2 Mechanisms of IT contribution to competitive advantage

From the reviewed literature, three relevant mechanisms of IT contribution to competitive advantage were identified: increase of bargaining power over customer/supplier, increase business process effectiveness and decrease of costs (Sethi and King, 1994, Piccoli and Ives, 2005, Bakos and Treacy, 1986, Porter, 1985).

Bargaining power

Bargaining power is divided into customer and supplier bargaining power (Porter, 1985). Application of analytics in the supplier domain is out of scope for the current research. Therefore only customer-related bargaining power mechanisms are further reviewed. Bargaining power of the company over its customer is also referred in the literature as customer value (Srivastava et al., 2001).

Product features

A customer chooses between competition based on product features and functional attributes. Therefore it is valuable to the company to provide unique product attributes desired by the customer. Among attributes are product image, quality of customer services, fit of features to the needs of the client, easiness to select and quality of ordering and handling a service/product. IT was able to contribute to these and other product features in the past (Johnston and Vitale, 1988).

Switching costs

This category refers to costs that a customer/supplier has to incur if he/she wants to switch to another supplier/customer (Piccoli and Ives, 2005). These costs arise when a customer/supplier needs to make any co-specialized investments or network externalities take place (Piccoli and Ives, 2005). Tangible co-specialized investment include all investments in physical assets that a customer/supplier has to make in order to participate in the initiative (Piccoli and Ives, 2005). Intangible co-specialized investments are time expenditure, specific training, specific knowledge accumulation by customer/supplier and uncertainty surrounding decisions to switch (Piccoli and Ives, 2005). Network effects arise when participation in the dominant network gives the most value and also increases the value of the network (Piccoli and Ives, 2005).

Marketing scholars have also been working on identification of switching cost types. The typology of switching cost was developed and empirically tested by Burnham et al. (2003). Switching costs are divided into three basic groups: procedural, financial and relationship switching costs. Procedural switching costs concerns mainly expenditure of time and effort. Financial switching costs concerns with the loss of financially quantifiable resources. Relational switching costs concerns with the emotional discomfort due to the breaking of the relationships or due to the identity loss with the brand. Table 2-1 represents the typology of switching costs.

Category	Switching cost	Description
Procedural switching costs	Economic risk costs	It is associated with uncertainty and asymmetric information about the provider. The longer customer consumes products or services of a certain company, the more information he gets about the company and the less uncertainty surrounds the transaction.
	Evaluation costs aka search-related costs	Costs that customer needs to make in order to find and contact another supplier; costs of locating and evaluating alternative suppliers; costs of evaluating customers and choose the most appropriate one.
	Learning costs	Learning costs are associated with time and effort required to acquire skills and know-how related to the product or service.
	Setup costs	Setup costs are the costs associated with initiating relationship costs related to time and effort.
Financial switching costs	Benefit loss costs	These are the costs that emerge if the customer has contractual ties that create economic benefits and that disappear in case of switching. These can be in a form of discounts or special offers if the consumer accumulated a certain points for purchases.
	Monetary loss costs	Monetary loss costs include two types of costs: transactional specific co-specialized investments and initial fees to become a client.
Relational switching costs	Personal relationship loss costs	Personal relationship loss costs arise, when the consumer has developed personal relationship with employees of the company. Personal relationship lead to more trust and certainty that is not directly available within the new provider of goods or services.
	Brand relationship loss costs	Company or brand relationship ties break when consumer switches to another product or service provider. Consumers tend to identify themselves with the brands they purchase. For example in automobile industry consumers even create clubs to gather and talk about their favorite branded car.

Table 2-1 Typology of switching costs

Efficiency

Efficiency is the extent to which an IT application allows an organization to produce a product at a lower cost (Sethi and King, 1994). It results from improvements in organizational structure and/or processes that lead to decrease in process cost. In the literature indentified costs are associated with performing value chain activities (Sethi and King, 1994), encouragements of data standardization (Johnston and Vitale, 1988) and shorten response time. Customer analytics has an ability to decrease retention and customer acquisition costs (Berry and Linoff, 2004).

Effectiveness

Effectiveness represents the extent to which IT helps to support the goals of the company. An example can be that IT helps to build and maintain customer loyalty (retain customer), increase market share, change the nature of the industry, increase monopoly or monopsony power (Sethi and King, 1994).

Customer analytics, if applied correctly, improves customer experience; therefore, has effect on customer retention. By itself this technology does not change the nature of the industry, but complementary customer-orientation does.

2.3 Barriers to erosion of competitive advantage

Rumelt (1984) in his study described a set of “isolating mechanisms”, which protect a resources from imitation. The first one is time compression diseconomies, which refers to a requirement of accumulating properties of a resource such as learning, experience or firm-specific knowledge. The second one is embeddedness of a resource, which refers to a present synergy between combinations of a resource with other complementary resources. Complexity and tacitness of these relations increase barriers to imitation (Bharadwaj et al., 1993). The third one is historical uniqueness, which refers to the first-mover advantage (e.g. brand loyalty, power to establish industry standards), path-dependency, etc. The last one is casual ambiguity, which refers to the availability of complex and unclear linkages that are too difficult to understand or manage. These isolation mechanisms could be seen back in IT-related literature; however, under different naming. Piccole and Ives (2005) have conducted IT literature review and suggested such classification: complementary resource barrier, IT project barrier and preemption barrier. The current study follows these definitions of IT literature.

Complementary resource barriers

Resources are heterogeneously distributed among the companies; therefore, some companies might possess a resource that is difficult to imitate and that is complementary to IT innovation. Examples of such resources can be scale, relationship contracts, existing innovations and difference in organizational resources (such as skills, brand equity, culture, etc). Moreover, companies differ in a degree of compatibility between organizational resources and IT, (Nevo and Wade, 2010). Complementary resources can be divided into resources that are complementary on the level of usage of IT (e.g. department or process) and on the level of the system (organization). Melville et al. (2004) have identified two major IT-related resources and capabilities that might provide sustainable competitive advantage: IT infrastructure and IT capabilities.

IT infrastructure includes existing hardware, data repositories and software(Melville et al., 2004, Piccoli and Ives, 2005). IT infrastructure is the most cited physical resource that is able to provide sustainable competitive advantage due to its complexity and historical path dependencies (Wade and Hulland, 2004).This barrier is due to asset stock accumulation effects.

IT capabilities can be divided into technical skills, IT management skills and relationship assets. IT management skills refer to the ability to manage IT projects, evaluate technology options, provide leadership for IS function, manage change, etc. Melville et al. (2004) have argued that technical skills can easily be obtained in the labor market, but Piccoli and Ives argue that it is a subject of organizational learning dynamics and knowledge barriers. Moreover, in case of the Netherlands, technical skills are scarce

and companies have to offshore IT activities in order to find talents. In the literature, the importance of relationship asset was also highlighted (Piccoli and Ives, 2005, Wade and Hulland, 2004). It refers to relationships between IT and business. It works through mechanisms of sharing the vision of IT role within the organization, share and accept the risks of IT projects, etc (Piccoli and Ives, 2005). Mata et al. (1995) theorize that those friendly and trusting relationships between IT and the business take years to develop and that it is built on past experience.

IT project barriers

The more time consuming and costly the deployment process is, the higher is the IT project barrier. This barrier consists of an IT characteristics related barrier and an implementation process barrier (Piccoli and Ives, 2005).

An 'IT characteristics' barrier includes the visibility of IT initiative to competitors, uniqueness of IT solution and the degree of complexity of an IT solution. As a good example of an invisible system could be Harra Entertainment's engine for data analysis. This is the most documented case of a successful use of analytics enterprise-wide (Davenport and Harris, 2007). In case if analytics is not a packaged solution (e.g. unique) then it is highly invisible for competitors. Considering complexity factor, then analytics is highly complex and requires data understanding, business understanding and statistics understanding (complex technology) (Davenport and Harris, 2007).

An implementation process barrier includes implementation process complexity and initial costs to deploy IT (Piccoli and Ives, 2005). Concerning analytics, implementation process complexity depends on the initial ambition of the company: the bigger the scope of analytical capabilities, the more complex implementation process. This ambition would differ from company to company. Moreover, this scope will also influence the degree of incompatibility between organizational resources and IT. Piccoli argues that this barrier will be reinforced if firm has company-specific business practices and processes. An example can be data driven decision making. If the firm has already practices and processes in place to base decisions on data analysis then it will be easier for the company to deploy Analytics.

It is worth mentioning, that analytical capability for marketing is mostly developed incrementally, while for maintenance a big bang approach is used. Therefore it has impact on the initial costs of a project. This difference stems from availability of data and necessity to be precise. In case of predictive maintenance, sensors have to be installed on equipment to collect data (while data about the customer is often available somewhere inside or outside an organization) and the failure to predict the event is much more costly. Therefore according to analytics consultants, initial costs of customer analytics is in the thousands of Euros, while in the predictive maintenance domain in the millions.

Preemption barriers

This category includes uniqueness of resources and capabilities. It includes unique know-how related to the system, requirement of unique resources by the system, IT system provision of unique access to the

sales channels, unique access to resources, protection of the system by trade secrets, patents and copyrights and if the system has impacted the development of technical standards in the industry (Sethi and King, 1994). Only some companies do not share knowledge outside the organization about their analytics activities such as price optimization. Moreover, models can be patented; however, these models often do not have a long lifetime (one month to one year).

2.4 Complementary resources and capabilities

Complementary resources and capabilities are often required to deploy and use IT successfully (Barua and Mukhopadhyay, 2000, Bharadwaj, 2000). An organization is a complex system and just following the rules of success does not help that much. It can be compared to IT development where if a change is made in a complex project, an unexpected problem might occur in some other place that a developer logically did not even change. In order to get more understanding on what type of resources and capabilities are involved in the compatibility concept, the complementarity literature is further reviewed.

Complementarities exist when two things combined reinforce each other (Ennen and Richter, 2010). This notion can be directly mapped to the synergy component of Systems Theory. Moreover, complementarity might also be undesirable as it might increase barriers to organizational change. The following complementary resources and capabilities that are relevant for IT adoption and use were identified from the literature: environment, human resource, physical resource, practices and policies, structures and processes, corporate culture and strategy and top management commitment.

Environment

Environmental factors such as location-specific factors or regulatory and market conditions might be complementary to organization specific properties (Ennen and Richter, 2010). In IS literature complementary nature of this category was also highlighted (Melville et al., 2004). In addition, it includes situations when IT spans firm boundaries and complementarities arise. These complementarities might include business processes, IT resources and non-IT resources of business partners, customers or suppliers (Melville et al., 2004). In order to survive and prosper, the company must provide customers what they want to buy.

Human Resources

Human capital refers to human-related competencies such as knowledge, experience, relationships, culture and intelligence (Barney, 1991). In the literature this element is referred to as knowledge and capabilities (Ennen and Richter, 2010) and it belongs to the category of intangible resource. Complementary investment falling into this category can be investment into new management skills and user training (Brynjolfsson, 2003, Davern and Kauffman, 2000).

Adaptability of employees

One of the crucial characteristics of human resource identified in the literature is adaptability of employees (Grant, 1991). With low adaptability employees resist to change (Markus, 2004). The main causes of low adaptability of employees are attachments to old work routines, to old organizational processes and to technology they use (Markus, 2004). Oreg (2003) has conducted an extensive literature review on the reasons of resistance to change. Reluctance to lose control is named as a primary reason of resistance. A number of organizational studies has focused mainly on overcoming this factor and argue that it can be overcome by involvement of employees to decision-making processes (Sagi and Koslowsky, 2000). Cognitive rigidity and lack of psychological resilience, intolerance to the adjustment period involved in change were also considered in the literature, but little support was found for inclusion of these two factors (Oreg, 2003). Preference of little novelty is expected to influence the adaptability of an individual (Kirton, 1976, Oreg, 2003). The last reason of resistance identified by Oreg (2003) is reluctance to give up old habits that aggregates the causes identified by Markus.

Skills of employees

One of the examples that can be found in the literature is that in order to profit from analytics, the company needs data analysts with domain-specific background (e.g. marketing) (Braunmuller, 2006). Also good analytical capabilities should be complemented by good information management capabilities to integrate, transform, extract and access data (Davenport and Harris, 2007). It is also important to consider market skills. These skills are complementary to customer analytics because without deep understanding what kind of business questions should be answered by analytics, it is not possible to use the technology in a proper way. For example, if a marketer is not used to conduct one-to-one marketing it would be difficult to start using analytics to drive personalized customer approach.

Moreover, as was mentioned in Chapter 2.3, IT management skills are also important to consider as a valuable and rare complementary resource. In case of customer analytics, these skills would reside in the IT department and in the customer intelligence department. The IT department is responsible for data repositories and IT infrastructure, while customer intelligence is involved directly to customer analytics-related projects.

Relationships

CA requires a lot of teamwork and sharing of knowledge. Taking into account that departments might have its own sub-culture, a difference between departments might have a negative effect on the use and innovation analytical capability. For example, a sales department could be goal oriented, while a marketing department is more towards a creative culture. The successful functioning of analytics requires these two departments to work as a team and having different backgrounds and sub-cultures could have an adverse effect on this collaboration. Customer relationship management literature also suggests that teamwork is a crucial part of success not only in analytical CRM, but also in CRM initiative at all (Peelen et al., 2009).

Markus (2004) argues that culture is one of a few organizational resources that often clashes with technological change.

Cognitive style

The cognitive style has always dominated the mind of scholars studying decision making (Turban et al., 2007, Choo, 2006, Hunt et al., 1989). Cognitive style is an individual characteristic and a consistent approach to organize and process information (Hunt et al., 1989, Tennant, 1988). Even though Choo (2006) suggests that each decision type requires another cognitive style, each person or group of people have preferred style to make decisions (Hunt et al., 1989). There are a number of studies available that are defining categories of cognitive style. Hunt et al. (1989) uses Jung's psychological theory and divides cognitive style of individuals into intuition-based and analytics-based. Individuals with intuition-based style look at problems as a whole, while individuals with analytics-based style concentrate on detail and break the problem into parts. Other authors argue that individuals differ in the way they acquire information and in methods they use to process information (Mitroff, 1983). However, Keen (1973) in his work has proven that dimensions of cognitive styles are not empirically independent. Therefore the majority of individuals will be classified into analytical or intuitive in both information gathering and processing (Hunt et al., 1989). Moreover, there are a lot of classifications of cognitive styles available; however, the view is widely shared that intuition and analytical are the two basic cognitive styles (Nickerson et al., 1985).

Physical resources

Physical capital refers to physical resources such as a manufacturing plant, equipment, physical technology, geographical location, financial assets and access to raw materials (Barney, 1991).

IT infrastructure

IT software infrastructure includes statistical applications to conduct analysis (e.g. SPSS or SAS), software that uses models or scores that are based on models (e.g. campaign management tool, website or CRM system). Indirectly it involves IT systems that collect data within the enterprise (e.g. transactional systems). As it was mentioned in Chapter 2.3, IT infrastructure is able to provide a sustainable competitive advantage, because of its complexity and historical path dependencies. The latter means that companies differ in their bundles of IT systems; therefore, some companies do not have to put a lot of effort in the deployment of analytics, while others have to work out all the incompatibilities between their different IT systems. Analytics requires data exchange between different IT systems and deployment of changes into different IT systems.

Data infrastructure

Analytics on the technical level is all about data. In order to be able to perform an analysis, data first needs to be cleaned, integrated and made accessible and only then statistical techniques can be applied. The better the quality of data the more possibilities open up with analytics.

Nowadays more and more transactions involve IT systems, which lead to data overload. A business user has high expectations on data and demands historical, clean, consolidated, point-in-time, real-time and unstructured data, and remote data availability (Turban et al., 2007). Data requires to be integrated and organized in the way that is useful (Turban et al., 2007). Furthermore, one of the biggest challenges is that data is fragmented, inconsistent and without a context (Davenport and Harris, 2007). Therefore data needs to be managed and governed. One of the strategies to overcome data quality problems is to develop a culture of quality with a quality assurance plan, which was successfully implemented by The Montana Department of Corrections (Turban et al., 2007). Table 2-2 outlines issues related to data quality.

Data quality problems	Description
Contextual data quality	Relevancy, added value, timeliness, completeness, amount of data
Intrinsic data quality	Accuracy, objectivity, reputation, believability
Accessibility data quality	Accessibility, access security
Representation data quality	Interpretability, ease of understanding, concise and consistent representation

Table 2-2 Data quality dimensions (Turban et al., 2007)

Financial resources

Financial resources are heterogeneously distributed across companies. Depending on priorities and availability of money, budgets of companies differ. This category concerns not only costs that are directly involved in investments in analytical innovation capability, but also costs that are associated with other organizational resources expenditure such as IT. Each company has a limited budget; therefore, it distributes the budget according to its priorities. Therefore, strategic priorities are also reflected in the budget and in shared resource distribution such as IT. Moreover, depending on strategic partnerships and company profits, each company could experience different possibilities in their money supply.

Practices and policies

Practices and policies refers to organizational routines, which determine skills, values, culture and knowledge needed to perform work (Simon, 1945, Melville et al., 2004). An example of investment falling into this category can be the usage of standards, recruitment criteria, promotional practices, investments into the new working practices, investments into performance measures, introduction of IS governance, environmental audits and total quality measures (Brynjolfsson, 2003, Davern and Kauffman, 2000, Brynjolfsson and Hitt, 1998). Payne and Frow (2005) suggest that traditional *performance measurement* system will not fit cross-functional analytics activities. Moreover, some individuals or functions might consider sharing of customer data as a loss of power (Chen and Popovich, 2003). Therefore policies need to be adjusted to promote collaboration between departments.

Structure and processes

Structure refers to the formal allocation of work roles and administrative processes to control and integrate activities (Child, 1972). Structural changes influence responsibilities, accountability, command lines and information flows, number of hierarchies and divisional structure (Armbruster et al., 2008, Ennen

and Richter, 2010). Moreover, change in organizational boundaries falls also in the category of organizational structure change. This includes change in structures with external parties such as customers, suppliers, competitors, business partners and government (Zand, 2011). As an example of structural boundary change can be outsourcing, alliance for R&D cooperation and joint venture.

Process is the ordering of activities with clear input and output (Melville et al., 2004). A number of studies showed that reengineering of business processes due to IT deployment initiative had a positive impact on firm performance (Gunasekaran and Nath, 1997, Markus, 2004). One of the examples of incompatibility between the business process and IT is the software that requires customer to be a center of attention, but the company is organized around the products (Braunmuller, 2006). In order to realize benefits from customer relationship initiatives, business processes need to be reengineered (Chen and Popovich, 2003, Bull, 2003). They should be organized around a customer lifecycle and information should be shared between all business processes that are involved in the customer interaction with a company (Peelen et al., 2009).

Corporate culture

Scientific literature also suggests that an analytical approach to customer initiative requires changes to an organizational culture (Chen and Popovich, 2003, Zairi and Sinclair, 1995). Zablah et al. (2004) argue that customer-centric culture is important. Therefore, customer-centric culture is an important resource that is needed to realize benefits from customer analytics.

The most accepted typology of culture was developed by Cameron and Freeman (1991) that is used in the current research. They identified four dominant types of cultures: clan, adhocracy, hierarchy and market. The dominant attributes can be found in Appendix 5. Of course one pure culture type is rarely possible in practice and most often an organization would experience a mixture of cultures. It is suggested that analytics is compatible with a certain culture more than with the others. Case studies would help to identify which one is the best fit for analytics.

Strategy and Top Management Commitment

Strategy refers to corporate strategy and competitive strategy (Ennen and Richter, 2010). Competitive strategy is also known as business strategy and defines how a firm competes. It can be defined as a market focus of an organization and its choice for competitive strategy. There are three pure types of competitive strategies defined in the literature: cost leadership, differentiation and segmentation (niche) (Grant, 2009, Schilling, 2008). Corporate strategy is concerned with a scope of organizational activities. This includes product scope choice, geographical scope and vertical scope (Grant, 2009). Product scope includes decision to be a more specialized company or diversified company. Geographical scope refers to choice of areas of operation. Vertical scope considers a level of vertical integration (e.g. in-house/outsourced value-net activities). Complementary investments in new strategies were also mentioned in IS literature (Brynjolfsson and Hitt, 1998). For example, if analytics is used for marketing purposes, analytics should be embedded into

the corporate customer relationship strategy, so that actions are taken to support decisions made based on analytics (Berry and Linoff, 2004).

Top management commitment is one of the most cited resources required to be able to make some major organizational change. Also the literature on complementarities and business process reengineering highlights importance of senior sponsor of a change (Powell and Dent-Micallef, 1997, Aral and Weill, 2007). Customer relationship literature also stresses the importance of top management commitment. Some authors argue that top management creates a vision and strategy that in turn directs efforts and motivate employees (Payne and Frow, 2005, Zablah et al., 2004, Iriana and Buttle, 2006).

2.5 Summary

IT resources do not provide sustainable competitive advantage by itself; however, in the combination with other organizational resources it might be able to do so. Also an IT system has different levels of synergy in different organizations due to resource heterogeneity. Therefore, in order to be able to analyze the differences between environments where IT is applied in a systematic way, the system theory view is adopted in this study that sees organization as a system containing of another systems or basic elements.

The reviewed literature suggests three basic mechanisms that lead to an improvement of competitive positioning with analytics: increased effectiveness, efficiency of marketing capability and increase of bargaining power over the customer. Improvements of bargaining power in turn have two relevant underlying dimensions: improvement of product features and an increase of a customer switching costs. Moreover, once the company has managed to get an advantage with IT there are three mechanisms that might protect the advantage: building a preemption barrier, the visibility, uniqueness and complexity of an IT project and the availability of a complementary resource that acts as a barrier. At last, literature was reviewed on complementarities that serve as a framework to analyze the degree of compatibility of customer analytics with an organization. These complementarities are divided into these categories: environment, human resource, physical resource, practices and policies, structure and processes, corporate culture, and strategy and top management commitment. Human resources are further divided into adaptability of employees, skills, relationships, and cognitive style. Physical resources consist of IT infrastructure (software and hardware), data infrastructure and financial resources.

In the next chapter a potential value of customer analytics is identified with a literature review. First, analytics is defined and a technical domain is outlined. A technical domain suggests a degree of complexity of analytics as a technology. High complexity sets naturally an IT project barrier. Then customer relationship and marketing literature is reviewed to identify basic dimensions of potential synergy between customer analytics and an organization.

Chapter 3. DOMAIN OVERVIEW

3.1 Analytics overview

Analytics can be defined as “the extensive use of data, statistical and quantitative analysis, exploratory and predictive models, and fact-based management to drive decisions and actions” (Davenport, 2006). There are numerous definitions in the literature that could be related to analytics such as advanced analytics, business intelligence, data mining, etc. Advanced analytics can be defined as a set of analytical applications to measure, predict and optimize organization performance, customer relation, etc (Bose, 2009). Data mining is the exploration and analysis of large quantities of data in order to discover meaningful data and patterns (Berry and Linoff, 2004). Moreover, some studies put Analytics under umbrella of Business Intelligence (BI), while others define BI as only descriptive manipulation on data (e.g. reporting what happened, drill into past events to understand the complex picture). The latter group defines separate analytics concept that is referred to as a more advanced technique to discover knowledge and based on predicting future events and behaviors (Bose, 2009). So from these definitions it can be seen that no sharp difference can be made.

In order to get more understanding which physical resources play a role for customer analytics, a technical environment of analytics is discussed. The technical environment of analytics is widely described in business intelligence literature. The need for business intelligence solutions stems from the need to integrate data from multiple transaction systems in order to get a single version of the truth about a customer, a supplier, a business process, etc. **Transaction systems** are important for enterprise intelligence, it is the eyes and ears of the organization (Berry and Linoff, 2004). However, these systems are not developed with intelligence or analytics in mind and they serve rather the operational needs of the company (Berry and Linoff, 2004). It is rather not advisable to perform data mining or analytics activities on an operational system on which business survival depends on (Berry and Linoff, 2004). Business intelligence initiative is run with the purpose is to explore, integrate, aggregate and analyze the data (Olzak and Ziembra, 2007). The majority of organizations use a data warehouse to aggregate data from various data sources and to use this aggregated data for business analysis (Burstein et al., 2008). The role of data warehouses is to covert and integrate raw data from different data sources, whereas analytics converts this data into information or knowledge (Burstein et al., 2008).

The simplified structure of the technical environment of analytics is shown in Figure 3-1. Multiple data sources have different data formats and may refer to the same entity in different ways. Therefore, ETL (extract, transform and load) process is used to integrate and to load data from different data sources into a data warehouse.

The analytical models that are generated as a solution to a particular business objective are often uploaded back into IT systems directly or through data storage, so that the users could use them as, for example, a part of a customer relationship system or a web portal. Operational processes elaborates on

how the chosen set of business intelligence systems collaborate together and how reliability, scalability and security is ensured (Davenport and Harris, 2007). It includes standards, processes and policies to ensure that data are of a high quality and are used according to regulatory, legal or business standards.

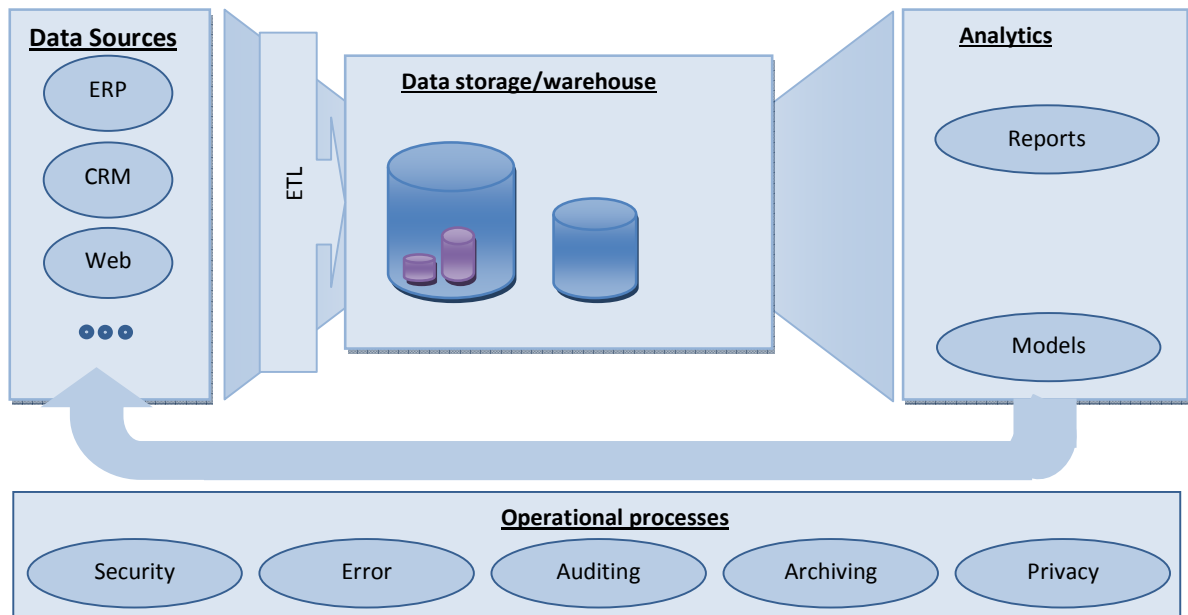


Figure 3-1 Analytics technical environment

Data warehouse is a subject oriented, non-volatile, integrated and time variant collection of data that is aimed at supporting decision making process (Burstein et al., 2008). A data warehouse contains clean data (i.e. where conflicting and inconsistent information is removed), with time series containing historical state of the data (Burstein et al., 2008). Also data warehouse contains metadata, which can be defined as information over data (Davenport and Harris, 2007). This information may include information about the source, format, calculation logic, unit of measurement, data reliability, accuracy, etc (Davenport and Harris, 2007). This metadata is also referred to as master data and used to ensure data consistency. Data warehouses can be quite large and in order to save computing power and time, data marts are often used to reflect frequently used data. Data marts contain only a segment of information in comparison with data warehouse. They are goal-oriented and support often only one business function. It is generally not recommended to use only data marts solutions as it means that data are dispersed across data marts and are not integrated (Davenport and Harris, 2007), setting some limitation on analytics.

In the literature a distinction is made between analytical capabilities of business intelligence solutions. Analytics is divided into two parts – the one looks into the past and the other into the future. The latter is in the literature sometimes referred to as *predictive analytics* or advanced analytics (Davenport and Harris, 2007, Tonissen, 2009). In the most often case, organization learn using analytics starting from descriptive analysis to more sophisticated predictive modeling.

3.2 Role of analytics in customer relationship management

In mature markets a lot of companies have decided to differentiate by developing and maintaining good relationships with their customers. Customer relationship initiatives stems from relationship marketing, which has as an aim to switch marketing focus from winning new customers to retention of existing customers. Retention of existing customer is cheaper than acquiring new customers (Birch, 1990) and especially important in highly saturated Dutch markets. Therefore a lot of companies refocused to become a customer-oriented organization (Bull, 2003). One of the reasons to switch was that companies with a lot of customers find it difficult to be as personal as small companies with their customers (Chen and Popovich, 2003). The customer relationship initiative aims to create a single view of a customer within a company, because it is believed that effective management of customer relationships improves customer satisfaction and retention (Chen and Popovich, 2003).

In the past decade a lot of companies went through the deployment of customer relationship management (CRM) software to foster closer relationship with their customers (Rababah et al., 2011). In the literature there are multiple conceptualizations of what CRM is (Bull, 2003, Chen and Popovich, 2003, Zablah et al., 2004, Malte, 2005). Many scientific articles claim that CRM is not only a technology, it is rather a philosophy, and the technology role is to support that philosophy (Payne and Frow, 2005).

In the literature, CRM is often viewed as a process that has as an aim to optimize the relationship between the company's investments and a customer satisfaction to generate maximum profits (Malte, 2005). According to Malte (2005), this includes such elements: monitoring customer behavior and needs; learning to apply customer knowledge through trial and error; integrating marketing, sales and service activities to achieve a common goal; deployment of systems to acquire and share customer knowledge and measure CRM initiative effectiveness. Zablah et al. (2004) has conducted an extensive literature review and identified five perspectives on customer relationship management: a process, a strategy, a philosophy, a capability and a technological tool (Table 3-1).

Perspective	Representative conceptualization
Process	Creation and leveraging of linkages and relationships with external marketplace entities such as channels and end users.
Strategy	Investment in (potentially) valuable customers for the firm and minimization of investment in invaluable customers. This view represents portfolio theory.
Philosophy	Business philosophy targeted at achievement of customer-orientation of the company
Capability	Willingness and ability to change behavior toward an individual customer based on all information you have about the customer
Tool	It is technology used to integrate sales, marketing and service information systems to build partnership with the customer.

Table 3-1 Dominant CRM perspectives (Zablah et al., 2004)

The capability view of CRM is grounded in the resource-based theory (Zablah et al., 2004). This view suggests that a successful CRM initiative demands two capabilities of the firm: gathering information about a (prospect) customer and applying that information/knowledge to shape interaction with that customer (Zablah et al., 2004). However, in cases with more analytically-enabled CRM initiatives, information about a

customer is being processed by analytical technology to enhance existing knowledge with new information on data patterns to eventually achieve more personalized contact with customers (Berry and Linoff, 2004). Therefore, an additional capability is required for analytical CRM: capability to extract knowledge from available information.

All in all, customer relationship literature suggests how to make customer relationship a distinctive capability of an organization by saying that the whole organization should be built around customer centricity (Peelen et al., 2009).

3.3 Potential areas of customer analytics use

Customer analytics is applied to marketing processes in the company. Decrease of marketing activities costs can contribute to competitive advantage (efficiency). Moreover, analytics might enhance effectiveness of marketing processes or enable the company to increase bargaining power over its customers through more smart marketing capabilities. One of the difficulties in applying the resource-based view (RBV) is that it has no generally accepted classification of resources (Priem and Butler, 2001). In order to map marketing domain to RBV, marketing research tries to identify capabilities that are marketing specific and potentially satisfy at least one of the VRIN conditions (see Chapter Chapter 2). In the literature these capabilities are referred to as **market-based assets** and they are divided into relational and intellectual assets and capabilities (Srivastava et al., 2001).

Relational assets and capabilities are intangibles that include perceptions by and relationships with customers, channels, strategic partners, providers of complements, outsourcing agreements, networks and eco system's relationships. **Intellectual** assets and capabilities are associated with internal knowledge that resides within an organization. They concern knowledge of external environment, knowledge of internal environment, know-how embedded in individual or department skills (e.g. analytical skills), know-how to leverage external relationships (e.g. cross-sales) and process-based capabilities (e.g. CRM skills). These resources and capabilities are leveraged in market-facing business processes (Day, 1994, Srivastava et al., 2001). Intellectual assets and capabilities can be enhanced with the use of customer analytics. However, relational assets act as a necessary complement.

Drawing on resource-based view, a number of studies have tried to identify marketing resources capabilities in more detail. The most extensive collection of marketing resources and capabilities was conducted by Vorhies and Morgan (2005). They divide capabilities into pricing, product development, channel management, marketing communication, selling, market information management, market planning and marketing implementation. In a Table 3-2 an overview is given of the possibilities of analytics use to improve each capability.

As was described above, marketing capabilities contain two basic assets: relationship and intellectual. According to definitions, good relationship asset strongly complements intellectual asset in such capabilities as channel management, marketing communication and selling. All other capabilities rest

mostly on intellectual assets. Marketing capabilities are often spread across an organization and is hidden in a marketing department, product management department, revenue management department, sales department, customer service department, etc.

Marketing capability	Definition	Analytics use
Pricing	An ability to adjust prices quickly as a response on changes in a market. This capability includes pricing skills, knowledge of competitors' pricing tactics and also knowledge of current level of competitors' pricing.	Analytics can be used to optimize pricing by predicting elasticity of demand and willingness to pay on customer basis (Rygielski et al., 2002).
Product development	An ability to develop new products and services, to conduct marketing tests of new products, to launch successfully new products and to ensure that they are matching customer needs.	Provide effective targeted product development capabilities, predict features of the product that would meet customer demand (Rygielski et al., 2002)
Channel management	An ability to ensure a strong relationship with customers ¹ , to attract and retain the best customers, to provide high level of service support to the customer and end user, to work closely with customers, to create a value for a customer.	Analytics helps to identify what product is better to sell through which channel, predict customer lifetime value (Rygielski et al., 2002, Berry and Linoff, 2004)
Marketing communication	An ability to develop and execute advertising programs. It also includes advertising management skills, advertising creative skills, public relations skills, brand and corporate image management processes and skills.	Indirect application of knowledge gained from analytics to make decisions.
Selling	An ability to provide effective sales support to the sales force. It includes also sales management and sales skills, sales management and control systems.	Analytics helps to predict what products the customer is most likely to buy
Market planning	An ability to effectively segment and target market and to develop creative marketing strategies. Marketing management and planning skills also fall into this category.	Analytics often helps to identify clusters of customers in data and their potential needs, so that it might boost targeting and segmentation of customers (Berry and Linoff, 2004, Rygielski et al., 2002).
Marketing implementation	An ability to allocate marketing resources effectively, to translate marketing strategies into action and to perform quick execution of them, to monitor marketing performance and to organize effectively marketing programs.	Analytics can help to monitor marketing campaign performance (Rygielski et al., 2002)

Table 3-2 Possibilities of analytics to contribute to marketing

Therefore, as it can be seen, analytics can be applied to boost and enable a lot of marketing capabilities. However, it is important to realize that there are also relational and creative parts of the marketing that cannot be substituted with technology.

3.4 Potential synergy between analytics and customer-facing capabilities

According to the Vorhies and Morgan definition, marketing information management is an ability to track a customer's wants and needs, to conduct a marketing research and to make a full use of it, to gather information about customers and competitors and to analyze market information. Therefore, marketing information management includes a capability to gather information about (prospect) customer and a capability to extract knowledge from it, while the other resources and capabilities can be used to shape

¹ Customer is an entity with which a company has a direct contact/transaction.

interaction with (prospect) customer. So the analytics-enabled customer management works through the following mechanism: first, information should be gathered about (prospect) customer, then knowledge should be extracted from this information by applying analytics and then this knowledge might be applied through marketing capabilities that are included in Table 3-2. This last step is in practice sometimes called the ability to act on insights.

3.5 Summary

Analytics is being studied as a part of different research streams such as customer relationship management, marketing, business intelligence and data mining. Business intelligence literature provides understanding of the technical environment of analytics that consists of four major parts: data sources, transformation and extraction, data storage and the analytical software packages itself. CRM literature suggests two necessary capabilities for customer interaction: an ability to gather information and an ability to apply it to shape interaction with the customer. A third capability was identified to enable analytical CRM: an ability to extract knowledge from gathered information. This capability is enhanced by usage of analytics technology on information (data). Potential usage of analytics was found in marketing literature: pricing, product development, channel management, marketing communication, selling, market planning and implementation. Analytics has an ability to contribute to most of these capabilities on intellectual dimension and relationship assets are complementary to it.

In the next chapter a conceptual model is proposed and a research methodology is outlined.

Chapter 4. CONCEPTUAL MODEL AND METHODOLOGY

4.1 Conceptual model

An extent of a realized synergy with analytics technology, in a context of customer relationship management, depends on a combination of capabilities: an ability to gather information, an ability to extract knowledge from the gathered information and a degree of analytics usage in customer-facing interactions (see Chapter 3). Drawing on the theory outlined in Chapter 2, a compatibility of analytics with an organization influences a degree of realized synergy from analytical initiative. This compatibility is an aggregated concept that reflects a degree of fit between analytics and all complementary organizational resources. Low compatibility would lead to time lags of deployments of analytical innovations that would have adverse effect on the costs and speed of innovation. Based on this reasoning the following Hypotheses can be defined:

Hypothesis 1: *The greater the capability for customer analytics, the more competitive advantage can be achieved.*

Hypothesis 2: *The lower the compatibility between customer analytics and complementary resources, the lower the customer analytics capability.*

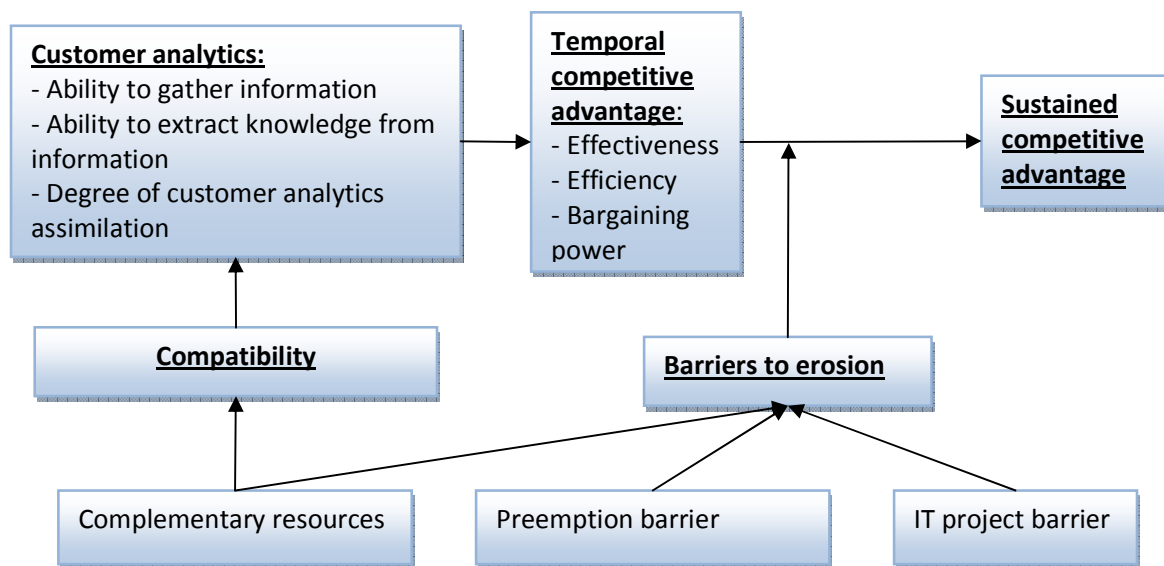


Figure 4-1 Conceptual model

Moreover, complementary resources may also act as a barrier to erosion of achieved competitive advantage. The other two IT-related barriers to erosion are preemption barrier and IT project barrier (see Chapter 2.3).

4.2 Methodology of the research

4.2.1 Motivation for a mixed approach

This study uses two research methods: an exploratory case study approach and a quantitative analysis (a survey). The case study is used to contribute to the knowledge of organizational related phenomena, where

boundaries cannot be clearly defined and the theory is not well developed. Moreover, the phenomena can be observed only in natural settings (Yin, 2002); therefore, the evidence is collected in natural environment. Also a case study is a recognized method in business studies (Ghauri and Gronhaug, 2002). Due to the fact that robust triangulation of sources of evidence was not possible to hold, a survey data on customer analytics practices was used to achieve method triangulation (Velde et al., 2004) that improves validity and generalizability of the study findings. The survey was conducted outside the Netherlands, while case studies were conducted in the Netherlands. So there is no risk that the same respondents were contacted during the case studies and the survey.

Not all case study findings can be checked statistically; therefore, it is worth mentioning that one of the critiques of the case study research is that it gives little base for scientific generalization. Yin (2002) suggests that case studies are generalizable, not to population, but to theoretical propositions. The goal of the case study is an analytical generalization instead of statistical generalization. That was one of the reasons for identifying propositions up front and conducting extensive literature research.

4.2.2 Case study

The research would follow Yin's approach at conducting case studies. This approach was recommended during the research methods lectures at TU Delft.

Cases' selection criteria

The current research aimed at empirical investigation of customer analytics contribution to achievement of competitive advantage. Moreover, compatibility with the environment, ITized resources and capabilities and organization-level resources and capabilities are also studied. In addition, barriers to erosion of achieved advantage are also studied for each case.

These criteria are used to select cases:

- The company should have presence in the Netherlands;
- There should be a willingness of the company to participate in the research;
- Predictive analytics should be applied to customer-facing processes;
- The case should be in the service industry (requirement from the client);
- The case should deploy analytics in at least 1.5 year prior to the research.

Case study design components

Yin (2002) identified components, which should be addressed in the case study research design: research question, propositions/hypotheses and unit of analysis.

An organization is a primary *unit of analysis* of the current study. However, an IT asset rather directly impacts the business processes; therefore, as was identified in the literature, the author will look how the technology impacted the business process and how this change impacted the organizational competitive advantage.

The *Research question* is identified in Chapter 1, while the *hypotheses* are developed from analysis of the relevant theory. Propositions help to identify relevant information during the research and help to stay within the feasible limits (Yin, 2002). Moreover, an interview guide was developed in order to gather information. The questions were clustered into technical, business and user related questions. During the first interview, opportunities were considered about the possibility that the interviewee could redirect to the proper person within an organization.

In order to collect data, half-structured interviews with senior managers in the five selected companies were conducted and other related archived documents were collected. Half-structured interviews help to set the direction of the interviews; however, it was expected that some important background information could come up and follow up questions would benefit the research. Interviews give a lot of information in a relatively short time; however, they are a rather expensive method in terms of time and effort needed to analyze the results (Velde et al., 2004). After the data collection, a within-case analysis was conducted. The purpose is to understand the context of each case separately as a standalone-entity. This helps to identify patterns without pushing for general patterns across cases and familiarity with each case separately will accelerate cross-case analysis (Eisenhardt, 1989). The next step is a cross-case analysis, which helps to identify commonalities and differences between cases in order to make generalizable conclusions. In order to minimize information processing problems, first the banking industry cases are compared on similarities and differences. Only after that all cases are cross-analyzed.

Moreover, at the last month of the research an extra case came up (airline company), but due to time limitations the case was not included in the research.

Criteria for judging the quality of the research design

In order to judge the quality of the research design, it should pass four tests: construct validity, internal validity, external validity and reliability (Yin, 2002).

Construct validity

Construct validity refers to establishing correct operational measures for the concepts under study (Yin, 2002). Yin suggests that in order to satisfy construct validity, a researcher should first select specific types of changes, and then demonstrate that selected instruments do measure these changes. The main purpose of the research was to study the compatibility level of analytics technology when applied to customer-facing processes and competitive advantage that it is able to provide. The literature review was conducted to specify possible organizational elements that might be complementary to technology adoption. Also potential sources of competitive advantage were reviewed together with barriers to erosion. All definitions were explained to the interviewees where needed in order to reach a common understanding. In order to increase the construct validity, multiple sources of data were used, when possible, to overcome subjective judgment issues. The collection of case studies, different company-related documents and other electronic

documents were collected for each case. Also key informants were given the opportunity to review draft case study reports and interview notes.

Internal validity

Issues with an internal validity arise when a researcher made casualty conclusions based on spurious relationships between variables under study (Yin, 2002).

In order to increase the internal validity a number of tactics were used during the data analysis stage of research: pattern-matching and explanation-building. Pattern-matching was conducted in the form of matching falsifiable developed propositions with empirical patterns. Explanation building was done in a form of analysis of the case study data by building an explanation about the case.

External validity

An external validity refers to the domain to which the study can be generalized (Yin, 2002). The generalization is made analytically to a broader theory. In order to increase the external validity these tactics are used: usage of theory to analyze cases and use of replication logic in multiple-cases. Multiple cases can be compared to multiple experiments and if a number of cases show the replication of theory then replication can be claimed (Yin, 2002). Therefore, if multiple case studies replicate the theory then, according to Yin, the results of such replication might be accepted as providing support for the theory.

Reliability

Reliability refers to the replication of operations of the study leading to the same results (Yin, 2002). In order to increase reliability the case study protocol was used and a database of collected data was developed. The case study protocol consists of literature review, developed interview guide (see Appendix 1) and a proposal. Also case study documents were stored in the cases' database.

Case study analysis

A case study analysis is considered to be one of the most difficult and one of the least developed parts of a case study research (Yin, 2002). A few guiding works for a newbie exist (e.g. Miles and Huberman (1994)); therefore, a lot depends on investigator's style of rigorous thinking (Yin, 2002). In order to structure data analysis, Miles and Huberman (1994) suggest to define a matrix of categories and then to place the evidence within these categories. The categories were identified during the literature review and they are split into three high-level categories: analytical capability, compatibility and competitive advantage.

4.3 Quantitative study

During the search process for cases, the possibility has popped up to access raw survey data on customer analytics usage within 800 organizations. The survey is used to test the relationship between analytical customer-facing capability and competitive advantage. However, it is not possible to map the current research framework one to one to the survey data. For example, competitive advantage was measured only by relative improvement of sales, time to market and customer retention improvement. In

the current research data on company's revenues were not accessible; therefore, not used as a measure of competitive advantage. Operationalization of concepts is described in Chapter 6. Moreover, in order to judge the quality of the research reliability and validity should be considered.

Validity and Reliability

Validity is a degree to which a research reflects a chosen research problem. External validity refers to the extent to which the results of a study are generalizable. In order to generate the sample, the research company took the universe of companies from their own lists, cross referenced to published lists such as Dunn & Bradstreet, OneSource and Hoovers to make sure the list was up to date. A precondition was applied to select into the initial list only large companies that fit into four pre-defined industries: financial services, public services, products and resources. Then a sample was randomly selected to avoid a bias. Due to the use of the precondition, the research results can be generalized only to these industries.

Internal validity is the extent to which it can be accurately stated that the independent variable produced the observed effect. Analytical capability building occurs in time before the effect of it on sales, time to market improvement and retention improvement. The question about the outcome was formulated to reflect the consequences of the usage of analytics. One of the dimensions of internal validity is content validity. Content validity is the estimate of how much a measure represents every single element of a construct. In order to make sure that content validity is satisfactory; the literature review was conducted to define each element as close to the literature as possible. However, competitive advantage was not properly measured due to the fact that the data were collected independently from the current research and no possibilities were provided to influence the questions of the survey. Therefore, the content validity is not very high and the research results related to the survey should be treated cautiously.

Construct validity is a sub-dimension of internal validity that refers to whether a scale or test measures the construct adequately. There were no pre-tests conducted for the survey; therefore, it is difficult to judge construct validity. Moreover, a sample size is relatively small; therefore, the results should be treated with caution.

Reliability refers to a consistency of a set of measurements. Test-retest reliability is the reliability of measurements on its stability over time. There were no possibilities to conduct such a test. Internal consistency was measured by conducting Cronbach's alpha tests in case if the construct had a complex scale. In order to be able to reproduce the results, the used questionnaire can be found in Appendix 3.

Statistical methods

In order to reduce the number of variables *factor analysis* is used. Factor analysis is a method to construct one or more new dimensions based on a number of variables (Velde et al., 2004). Principal Axis Factoring is used to extract shared variance of variables to create a single indicator. This method is a preferred method of factor analysis in behavior and social sciences (Widaman, 1993). Bartlett's method is used to estimate factor scores, while Kaiser Criterion (eigenvalue \geq 1) is used to retain extracted factors.

Prior to conducting a factor analysis, Cronbach's alpha test is performed to test internal consistency for variables that are measured minimally on ordinal scale. This test is the most widely used measurement of the reliability of a scale and the minimum acceptable value is 0.6 (Velde et al., 2004). It is worth mentioning that Cronbach's alpha increases as the number of items increases. The Kaiser–Meyer–Olkin test (KMO) is used to measure sampling adequacy and values below 0.6 are suggested by Kaiser (1974) to be unacceptable.

Regression analysis is used to test a hypothesis. Depending on a type of scale on which a dependent variable is measured, a proper method is chosen among: linear regression (interval and ratio scale), ordinal logistic regression (ordinal scale) and logistic regression (nominal scale). Regression analysis helps to identify an extent to which independent variable can determine dependent variable.

Goodness of fit in regression analysis

In a linear regression R^2 is a measure of goodness-of-fit of a model. The closer R^2 is to 1.0, the more variance in the dependent variables can be explained by a model. In case of (ordinal) logistic regression, a result of a modeling process is a model based on the maximum likelihood estimates and these estimates are not based on minimized variance (as it is in the case of linear regression model). Therefore, it is virtually impossible to calculate the percentage of variance explained by the model. In order to arrive at some indicator of goodness-of-fit, Pseudo- R^2 was developed that does not have the same meaning as R^2 (percentage of variance explained); however, the closer it is to 1.0 the better the fit.

4.4 Summary

In this chapter a conceptual model was developed as a result of the literature review. Also two hypotheses were formulated:

1. the greater the capability for customer analytics, the more competitive advantage can be achieved;
2. the lower the compatibility between customer analytics and complementary resources, the lower the customer analytics capability.

A mixture of qualitative and quantitative analysis was chosen to conduct the research due to the time and access limitations. Due to the limitation in data source triangulation, the internal validity of the case studies is not high; therefore, the results should be treated with caution. The generalizability of the case studies was increased by including three different industries in the research that exhibits similar relationships with the customer and similar market conditions (mature Dutch market). The quantitative part can be generalized to a broader population of companies that fall into 4 pre-defined industries (see Chapter 6). However, internal validity is also not very high due to low construct and content validity.

Chapter 5. CASE ANALYSIS

In this chapter the case studies are described and analyzed. The hypotheses are evaluated based on this analysis. Hypothesis 1 is evaluated based only on the banking industry due to requirements for a competitive advantage concept (see Chapter 5.1). Hypothesis 2 is evaluated based on all case studies.

First of all, the main concepts are operationalized in order to provide a basis for further comparison between the cases. In order to support or reject in this study evaluated hypotheses, each item, which is included in the analysis, should be measured at least on an ordinal scale. After that the three cases from the banking industry are analyzed and compared. This provides a basis for rejecting or supporting Hypothesis 1. Then two additional cases are included (a telecom company and an automotive retailer). At the end of the chapter, a cross case analysis is conducted and Hypothesis 2 is evaluated.

Also data sources and a brief history of analytics within the companies can be found in Appendix 4.

5.1 Operationalization of concepts

5.1.1 *Competitive advantage*

Sustainable competitive advantage is difficult to operationalize. Therefore, some studies conceptualize competitive advantage as a systematical creation of above average returns (Schoemaker, 1990). According to strategic management literature, the most used assessments of performance on aggregated level are return on assets (ROA), return on investments (ROI), sales growth and market share (Bharadwaj, 2000, Dehning and Stratopoulos, 2003, Zand, 2011). However, aggregated firm performance is affected by a lot of unrelated factors to IT adoption; therefore, an aggregated measure of firm performance might not capture effects of IT adoption. For example, Ray et al. (2004) argues that the overall performance does not capture a competitive advantage that exist in one business process because of existing competitive disadvantage in another business process. Therefore, it has been suggested to take rather a dependent variable at business process or project level (Wade and Hulland, 2004).

All participating companies have noted that they hardly measure benefits achieved due to analytics usage. One of the reasons is difficult to measure such benefits due to complex linkages between analytics and other organizational resources. The other reason stems from strong belief of top management in analytics-driven customer orientation within participating cases; therefore, hard numbers were not required to adopt the technology. Moreover, annual reports also do not contain detailed information about business process performance. The decision was made to take the Dutch customer performance index as a dependent variable (competitive advantage) (Rijksuniversiteit Groningen et al., 2011) that is developed by Rijksuniversiteit Groningen, Mlcompany and Metrixlab. This is the only independent scientific research initiative within the Netherlands that measures companies' customer performance². This measure includes two variables: value to a company and value to a customer. 'Value to a customer' consists of relationship

² For more information go to www.dcpil.nl/methode

equity, value equity, brand equity and emotions of the client concerning the company. This element represents bargaining power of a company over its customers. 'Value to a firm' consists of costs incurred by the customer, retention chance, probability of future profits from a customer and a net promoter score (NPS). NPS is a customer loyalty metric, which was criticized in the literature (Keiningham et al., 2007), but combined with other elements it gives a clear picture of the customer value to the company. 'Value to a firm' could be mapped to effectiveness (retention chance, probability of future profits from the customer, net promoter score) and efficiency (cost associated with the customer). It is worth mentioning that Wade and Hulland (2004) proposed a criteria for a RBV dependent variable: it should provide an assessment of performance; it should take time into account; it should incorporate a competitive assessment. The measures represent customer performance, so that they provide an assessment of performance. The values were measured 2 consecutive years; therefore, the time element is also present. Due to the third criteria of competitive assessment, two non-banking cases are not included for evaluating Hypothesis 1. Information about their competitors' analytics usages is not available; therefore, a competitive assessment cannot be made.

5.1.2 Customer analytics capability

As was mentioned in Chapter 3, customer analytics capability consists of three complementary capabilities: an ability to gather information, an ability to extract knowledge from this information and a degree of customer analytics assimilation.

A capability to gather information can be evaluated by considering what kind of information is available for an analysis. Also considered are the ability to combine this information and the availability of the knowledge of external data. Previous work has considered market intelligence, which includes also information gathering, as a source of competitive advantage (Kohli et al., 1993, Jaworski and Kohli, 1993). However, the sources of information from which firms draw market intelligence are still not clearly defined (Adams et al., 2010). Table 5-1 summarizes possible sources of information identified in the literature.

A capability to extract knowledge from information relates to the level of knowledge and skills on how to use analytics for business purposes. The level of knowledge was difficult to measure during the interviews. However, the information was revealed on how many people are working on creating analytical models and also a degree of models' sophistication.

A degree of customer analytics assimilation is measured based on spread of analytics across functional areas that are described in Chapter 3.3. The coverage of this dimension does not mean that analytics is used across all business units. Therefore, extent of usage is also considered.

Based on analysis, a score is given for each capability that is measured on an ordinal scale ("low", "medium" and "high").

Data source	Description	Literature reference
Transactional data	A complete integrated history of transactions between a company and a customer.	(Winer, 2001)
Customer interaction	It represents data on interaction between a company and a customer that is not a transaction. Such information includes complains, service support, feedback from a customer about a product, data collected during web interactions (e.g. clicks and search queries), etc.	(Winer, 2001, Jayachandran et al., 2005)
Descriptive customer information	This information includes demographics, psychographics and lifestyle data. This information can be externally purchased or collected during customer interactions.	(Winer, 2001, Jayachandran et al., 2005)
Response to marketing stimuli	This data includes information about reaction of a customer on marketing activities (e.g. promotions). This information might be used to monitor analytical models related to marketing campaigns and also used as an input for analytical models.	(Winer, 2001, Jayachandran et al., 2005)
Market research	It includes information about market needs, size and competition.	(Sinkula et al., 1997, Kohli et al., 1993)
Data about the usage of a product	A company might also use data collected during a product usage, if of course it is not forbidden by regulations. For example, a bank might track transaction intensity and use this information for its retention models.	This item was added after the interviews revealed importance of this information for the majority of the cases.
Environmental scanning	This includes information on changes in regulations and technology	(Sinkula et al., 1997, Kohli et al., 1993, Jayachandran et al., 2005)
Suppliers data	This information includes inventory, purchase records, etc.	(Jayachandran et al., 2005)

Table 5-1 Sources of information for market intelligence

5.2 Bank A Case analysis

Bank A is a large private company of Dutch origin that has a global presence, but it is mostly oriented on the home market. It provides services for retail and business markets. The bank has a very high credit rating; therefore, it gets very cheap credits on the international capital market.

According to the company documents, it is highly decentralized and each business unit is a completely independent organization that has its own steering committee. The main organization provides services for shared support (including ICT and customer service) and common activities. According to the interviewee, the purpose of central service organization is to advice to its business units on strategy, policies, marketing, product development and ICT.

A minimum profit margin is required to achieve annually from each business unit. If this margin is not achieved then the central office intervenes. It would normally include firing a head of the unit and a reorganization of processes according to a central business model. Financially, business units pay for services of the head company in a lump sum and it is up to them to decide using a service or not. In addition, each business unit is independent from other business units and they do not share nor clients nor profits. If a client buys the product, all profits go to the business unit where the client is registered.

5.2.1 Customer analytics capability

The bank has started its movement towards analytics-enabled customer orientation for more than a decade ago (see Appendix 4). Therefore, the organization has quite established analytical capabilities, but its focus tends to be rather tactical and according to interviewee there is no analytics done on strategic level. Analytics within the bank is used to improve marketing campaigns, improve leads generation, and improve customer satisfaction and retention. IT provides the possibilities to communicate with a client in a same proactive way through different marketing channels.

Ability to gather information [Score: High]

Nowadays all data is stored in one data warehouse and a perception of its quality is high. Also IT infrastructure was standardized and it became easier to make changes that are required to collect extra data. Moreover, according to the manager, the analytics department deliberately learned how to combine data, what information to collect and what information to buy from third parties. However, employees are not willing to fill information into IT systems. The level of skill can be judged by the ability to integrated market research data, which are collected on aggregated level, to predict an individual customer behavior together with other sources of information. Taking into account also used information sources (see Table 5-2), this capability might be scored as High.

Data source	Gathered	Used for analytics
Transactional data	+	+
Customer interaction	Partly, no data gathered from the website. Information is gathered during interactions via all other points of contact (e.g. a call center), with exception of pre-sales information.	-
Descriptive customer information	+	+
Response to marketing stimuli	+	+
Market research	+	+
Data about the usage of a product	+	+
Environmental scanning	+	-
Suppliers data	No suppliers	No suppliers
Score High		

Table 5-2 Information assessment

Capability to extract knowledge from available information [Score: High]

The analytics department has developed expertise to combine information to develop sophisticated predictive models. Moreover, the analytics department is so advanced that it is able to produce complex predictive models that are based on other models. Of course this capability strongly depends on the strength of the capability to gather information, as information is a pre-requisite for this capability.

Degree of customer analytics assimilation [Score: High]

Table 5-3 summarizes a usage of customer analytics. The company uses analytics very extensively across all dimensions, except pricing. However, the choice of not using models for pricing might be deliberate,

because each business unit decides themselves what price to set locally. And according to the interviewee, the central department introduces only models that are generalized and suit to all business units. It is worth mentioning that not all business units use available possibilities. There is a lot of resistance to use more sophisticated analytics by over 30% of business units. Therefore, company could still improve this capability.

Area	Coverage	Description
Pricing	-	
Product development	Tailor product	The company uses analytics to tailor products. The use of analytics decreases time to market dramatically.
Channel management	Retention Outbound	The process is organized around a customer; therefore, responsible marketing employees monitor a probability of a customer to churn. Also based on other predictions (e.g. propensity to buy), marketers are trying to come up with a strategy to keep the high value customers. The company minimizes irritation of clients by sending outbound campaigns only to clients that are likely to react on the campaigns. It minimizes alienation due to irritation.
Selling	Cross-sales across all inbound channels	The company uses analytics-based cross-sales across all incoming customer contact. For example, on the website in form of a banner or when customer enters a bank shop or calls to the call center. Also employees see in CRM system recommendations for sales opportunities.
Market planning	Segmentation, tailoring marketing campaigns	Analytics is used to segment customers better and to calculate probabilities if a concrete customer would react to a concrete direct marketing campaign. A lot of money is saved by not sending to the group that is not willing to react.
Marketing implementation	Campaign performance monitoring	Analytics is used to calculate if a campaign is going to be profitable. It also shows if a campaign should be stopped with the current level of reaction on it.

Table 5-3 Application of customer analytics

In addition, a process of distribution of models is completely automated. A few years ago the company has introduced a recommendation system that provides already a recommendation to a user on how to interpret a certain score.

5.2.2 Compatibility

Environment [Compatibility: High]

According to the interviewee, the financial crisis of 2009 has provided an opportunity for the bank to acquire clients of competitors more easily. Trust of customers in most of the banks was damaged due to instable financial situation and government funds. An evidence of that was found during interviews at all banks, but also in annual reports of a government funded bank can be found that companies' strategy is to re-gain trust and improve brand image. However, Bank A has kept its reputation through the crisis, because it was not impacted financially by it; therefore, not funded by the Dutch government. Therefore, the acquisition of customers is an additional opportunity for this company in the Dutch market.

So the environmental conditions combined with a good company's performance have a positive influence on customer acquisition; therefore, it leads to more information collected on prospects and to more precise acquisition-related predictive models.

Human resource

Adaptability of employees [Compatibility: Moderate]

The bank has still to cope with “not invented here” effect for analytics technology adoption. Resistance to change takes place in adopting standard business practices, because, according to the interviewee, a lot of business units believe that they have unique processes that are the best for them. It seems that low adaptability of employees is a result of other complementary resources such as high level of decentralization and also experience with the technology use (trust in data that relates to cognitive style). It can be classified into Oreg’s (2003) resistance to give up old habits that are enhanced by the high level of decentralization of decision-making.

Skills [Compatibility: High]

The Marketing Intelligence department is very advanced in analytics and in the combination of different sources of data (including external data and marketing research data). Also the interviewee revealed, during the interview, a very deep understanding of the business. Moreover, on annual basis all branches get education on analytics that acts as a knowledge transfer process between branches and the centralized analytical department. Due to its long customer orientation, the company has developed very effective marketing capabilities to interact with a customer. Nowadays, it is one of the strongest brands in the Netherlands that is known to be financially stable and customer-oriented. Marketing skills to perform one-to-one marketing are also very good. The company practices an individualized approach to a client for more than a decade already. So that makes the marketing and analytical departments very skilled.

Relationships [Compatibility: Moderate]

In order to understand a customer, sharing intangible knowledge is important. The company sets employees from the central office at local branches to learn from them. The central office has no direct connection with a customer; however, it needs to have knowledge in order to be able to set right questions to data to be answered: “we do not see the customers in the central organization, but we have to invent and facilitate business lines, so you have to understand what is happening locally”.

Moreover, business units are independent to the extent of not sharing profits and historically also did not share information on customers. At the time when the central organization has decided to merge all data and improve integration of data, all data became visible to all business units. Due to the fact that business units compete between each other due to high level of decentralization, the rapid visibility of information has led to conflicts: “the real problem was the fight between business units for one customer that took years and years to get and to let these business units realize that we are one bank”. A lot of effort has been spent on improving relationship between business units. And the interviewed manager perceives that together with certain policies, the relationship between units is good. The tension between independent business units had made it particularly difficult for the company to cope with in order to make these units work as one entity. After a lot of convincing the company has managed to reach a team work

culture about 4-5 years ago: “by creating this kind of environment, we got much more satisfied customers and employees”.

Cognitive style [Compatibility: Moderate]

The interviewee revealed that the company deliberately tried to develop analytical spirit, otherwise there were a lot of resistance to use the technology. It was difficult for the company to overcome this resistance to base decision on data: “.. we had to do a lot of effort to convince to base decisions on data and get better decisions”. However, as it was said above, not all business units were enthusiastic about sophisticated new models and technology still has a room for more assimilation.

Physical resource

IT infrastructure [Compatibility: High]

After more than a decade of replacing outdated IT systems, the IT is very flexible and it is rather easy to deploy changes. Even though business units perform similar type of businesses, they made decisions in the past on IT systems to adopt locally. That led to different CRM systems across business units. However, a need to have a standard solution was quite strong due to a low ability of the IT systems to exchange information. The company needed to spend 4 years to replace local customer systems with an integrated centralized CRM system. Other tools such as marketing campaign management are also compatible with this CRM system.

Data quality [Compatibility: High]

Inappropriate data quality sets major restrictions on possibilities of analytics. The company already had started integrating all data related to a customer in one database back in 1995, because it was almost impossible to recognize patterns in missing or non standardized data. In addition, after implementing a standard CRM solution, data was better integrated. For example, it became easier to spot the same customer visiting different business units and to exchange data between IT systems due to the high compatibility. In addition, data quality is influenced by the ability to gather information and IT infrastructure. Overall data quality improves with the improvement of the ability to gather information, because it leads to a collection with only relevant information and with a well-thought data structure that is limited only by the possibilities of the IT software.

Financial resources [Compatibility: Moderate]

The company is the only Dutch bank that survived the financial crisis of 2008-2009 without profit loss. Therefore, according to annual reports, the company has a quite high availability of financial resources. However, there were some cuts in the B2C analytical group. Also, the B2B group did not grow in resources; therefore, there are some limitations due to capacity.

Policies and practices [Compatibility: Moderate]

Overall, compatibility between analytics and policies and practices really differ per business unit. There was no possibility to change policies regarding the sharing of profits, so the central office had to prove that

by not working as one team all parties loose in the end. It is worth mentioning that one of the solutions was to hide parts of the information from business units, for example, hiding the information about which customers from other business units are in the same operating area or showing only the market share per area. It took a lot of time and effort to develop a clear and incentive scheme to which all business lines would agree on.

There are two approaches to extend functionality of analytics: a central analytics department comes up with business questions or a number of business units submit similar requests to the analytics department. After that the department, with the help of centralized data warehouse and SPSS, comes up with analytical models to answer the business question. The model is then uploaded into the data warehouse and all customers are scored based on the models. These scores are then used extensively to generate lists for marketing campaigns and within customer relation management software.

Structure and processes [Compatibility: Moderate]

The more decentralized the company is the more business units perceive to have a right to decide for themselves. The central organization has to convince first the business unit managers to make a change and, in case of success, the business unit managers need to cope with resistance to change at workers' level. It takes time to adopt change and often only 30% of the branches adopt it from the beginning, which is rather low. Business units do not share profits; therefore, there was a lot of tension between business units concerning shared customers. The company has reorganized its business processes around the customer lifecycle already a long time ago. It is not anymore the product that needs to be sold; it is the customer that, at a particular moment of his lifecycle, desires to buy the product. In here lays the task of analytics to actually identify the right moment to approach the customer.

Corporate culture [Compatibility: High]

Even though there is virtually no organization that would have a one of pure cultures described by Cameron and Freeman (1991), there is a strong presence of clan elements however. The company needed to develop a more team oriented culture for a number of reasons. First of all, the extensive *sharing of knowledge* is extremely important. A lot of separate departments are involved into the customer interaction process and a lot of important intangible information is involved that is very important to share in order to be able to improve analytical capabilities. Secondly, all dispersed business units and departments need to *be seen as one integrated company* from the client perspective. So that if a client from one business unit walks in into another business unit he does not need to know the underlying differences between units, but see it as one company: "... working as a team helps you not having too much employees and sharing information helps people learn from each other and take over jobs, so it really helps". It took the company many years to make business units to work as a team.

Strategy and top management commitment [Compatibility: High]

According to company documents, a main objective for the company is to become a market leader by generating value to its customers. All actions of the bank are directed into increase of the value to the customer, but also at the same time increasing value to the company. Top management supports for more than a decade both: customer orientation as a differentiator and use of analytics. Due to the unique capability to stay profitable during the crisis, the company has utilized all three marketing tactics to achieve growth: retention, acquisition and increase of wallet share of existing customers. Even though the company claims to be extremely customer oriented, in practice it recognizes that there is still a domination of profit orientation. However, according the research conducted by Groningen University, the company is still a leader in generating value to a customer among Dutch banks.

5.2.3 Competitive advantage

For a long time, delivering value to a customer was a high priority in the company’s strategy. However, banking services are rather close to commodity; therefore, it is almost impossible to deliver the value through basic products (services). The technology enabled the possibility to differentiate with customer orientation, which increases switching costs through building relationships and reducing asymmetric information between a company and a customer. This view is also supported by the interviewee.

A sustainability of analytics advantage lays in the fact that it is not visible to other companies. Moreover, it requires a lot of learning in order to advance in it. The other thing that plays a role is the speed of analytical innovations. This speed depends not only on the skills of the modelers, but also on how easy it is to deploy a major change. In this case, IT infrastructure was deliberately integrated and the speed of deployment was really fast. In Table 5-4 can be found competitive advantage mechanisms in application to the case.

Competitive advantage	Case description
Bargaining power/ product features	The company tries to differentiate itself by providing tailored services to their small and medium enterprise clients. It is achieved partly through capabilities of analytics to tailor products to client needs and partly through local knowledge of a client by an account manager.
Bargaining power/ switching costs	One of the entry barriers to the banking industry is a requirement to a scale of operations. This scale has a major adverse effect on a personalized approach to a customer. However, analytics enables a capability to actually analyze customer data in order to cluster customers, which helps to provide personalized support. Moreover, predictive analytics technology even goes further by providing capability to be proactive with a customer. The company’s customer orientation strategy enabled by the technology provides a successful formula to operate. Already in mid 90s the company was able to calculate the value of a customer to the company. Moreover, back then the company was able to identify the current margin per customer (real value) and was also able to predict the potential margin (future value). It leads to reduction of costs associated with a customers’ evaluation and to concentration only on the most profitable ones.
Efficiency	The company does not measure explicitly the benefits of analytics. Cost reduction is achieved through an increase of the hit rate from marketing campaign. The technology helps to tune campaign targeting, leading to a reduction of the number of people who do not react on it. This helps to decrease the cost per customer on marketing. Moreover, due to low rents on banking services in the Netherlands, it is crucial for the company to decrease costs as much as possible.

Effectiveness	Even though the company has to put a lot of effort in convincing the decentralized business units to use analytics, there is a huge adoption rate among them. The technology helps to be pro-active with the customer, which results in increasing customer satisfaction and sales. Analytics helps to achieve differentiation of a company based on customer orientation.
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Table 5-4 Competitive advantage mechanisms

5.2.4 Discussion

The company had to put a lot of effort to realize synergies between technology and organization. The main issues are caused by a highly decentralized structure. The structure caused some tensions between business units and increased resistance to change. Moreover, the company has had quite a low level of IT infrastructure and data quality in the past. However, because it was one of the first movers in technology adoption, the company had enough time to make major improvements to make analytics more compatible with the organization.

Interestingly, moderate adaptability of employees is caused by cognitive style and structure. Also relationships resource is negatively affected by decentralization; however, it is partly compensated by policies and practices and elements of teamwork culture.

5.3 Bank B Case analysis

Bank B is a public company that has a presence on the Dutch market with some international operations related to property finance. The company is one of the largest financial institutions in the Netherlands that provides services to consumers and small and medium enterprises. It is worth mentioning that this company is considerably smaller than its competitors. The parent company owns also an insurance business that operates as a separate business line.

One of the major company weaknesses is an expensive funding that influence the profitability of the company (Standard&Poor's, 2010). As was mentioned above, banking industry is a low margin industry in the Netherlands; therefore, the cost of funding is extremely important for survival and profitability. The company's profits were really affected by the crisis; therefore, the main focus is nowadays to reduce operating and other costs to the minimum.

The company has defined its customer relationship management strategy only somewhere in the beginning of 2000. Before that, the company only had contact with its customers through the branch offices. Moreover, after realizing its multichannel strategy, it has appeared that branch offices and advisors are the most expensive channels, while internet is the most economic. Therefore it is no wonder that the company decided to switch from a traditional banking company towards an online operating company. Nowadays, all branch offices are transformed into the shops that facilitate internet access and rooms for advisors. Moreover, in order to provide human advice, which is so valued by its customers, the company already has set up a call center in 2001 which from the beginning was integrated with internet banking activities. Customer relationship management has a strategic nature and aims at satisfaction of customer

needs, provision of complete customer service through multiple channels, build long-lasting relationship with the customer and deepen the understanding about the customer.

5.3.1 Customer analytics capability

The company has just recently started with analytics; therefore, has only limited analytical capabilities. Analytics usage stays within the marketing department. The sales department is not yet satisfied with robustness of cross-sales predictions from models due to little cross-sales historical track.

There is no usage of analytics on internet activities of their customers and, considering the new online business model, it is a major minus. Therefore the benefits of analytics are not visible as there is little use of its power. Each client is scored by predictive models on probability of churn or probability to buy a particular product. These scores are exported into campaign management software and selections are made based on the scores for targeting marketing campaigns. Moreover, the scores are also used by marketing people, who are responsible for customer retention, to base their decision on for the probability that a customer would leave.

Ability to gather information [Score: Moderate]

The bigger advantage for information gathering in the bank is that the company has made a switch towards new integrated IT systems with a dedicated data warehouse, where all information is deliberately integrated. However, due to the low priority of customer analytics in the organization, it is virtually impossible to get changes implemented in IT systems. Table 5-5 summarizes assessment of used and collected information. Customer analytics is relatively new to the organization and knowledge on possible external information sources is very limited. Moreover, sources of information are barely combined and they are used as separate entities (e.g. market research is not mapped to transactional data trends). Taking it all into account, it can be stated that the ability to gather information is moderate.

Data source	Gathered	Used for analytics
Transactional data	+	+
Customer interaction	+	-
Descriptive customer information	Partly, missing a lot of demographics and lifestyle data.	-
Response to marketing stimuli	+	-
Market research	+	-
Data about the usage of a product	+	-
Environmental scanning	No information is collected about technology and what competition does with it.	-
Suppliers data	Not suppliers	No suppliers
Score Moderate		

Table 5-5 Information assessment

Capability to extract knowledge from available information [Score: Low]

The company has just started its journey towards customer analytics and there is only one person responsible for building models. This person is more a marketer with statistical knowledge than a statistician. Moreover, analytical expertise also resides in risk management department that complies with

Basel 2 regulations. The expertise from this department has helped to start the analytical activities in the beginning due to lack of expertise inside of marketing department. But there are a limited number of models developed and it is not going to be improved in the near future.

Degree of customer analytics assimilation [Score: Low]

All new changes are deployed enterprise-wide within the organization, because the company is highly centralized and it is also currently adopting an online business model. As it can be seen from Table 5-6, application of analytics is very limited.

Area	Coverage	Description
Pricing	-	No analytics driven pricing is deployed
Product development	-	No analytics driven service development is deployed
Channel management	Outbound	Only outbound channels use models to make informed decisions. The company is planning to implement soon inbound analytics-driven operations. For example, if a customer comes to the website then she/he gets a sharp offer that is made especially for him or when a client calls then the call center could work proactively with the client showing him/her understanding and care.
Selling	Little	The use of analytics to conduct cross- or up- sell activities is limited due to little cross sale activities conducted in the past.
Market planning	Targeting Campaign testing	The company uses predictive models to make a selection of the most probable customers to buy a product, leading to cost reduction per customer. It also helps the company to test if a campaign is going to be profitable by predicting how many people would react and what would be earned margins.
Marketing implementation	Campaign monitoring	Predictive models help to monitor marketing campaign to see if it is still going to be profitable and also help to remove the noise from other banks' activities.

Table 5-6 Application of customer analytics

5.3.2 Compatibility

Environment [Compatibility: Moderate]

According to company's documents the bank has changed its strategy by switching its focus from customer acquisition to customer retention and extension of wallet share. It might be due to lost trust in the bank by its customers. The financial crisis had negative impact on the company's profitability as well as the cost of funding. The Dutch government has provided financing to cope with the crisis; however, it has caused negative media attention. All in all, customer extension and retention focus provides more ground for analytics usage because it is easier to make reliable analysis on existing internal data than on external data about prospects. However, customer acquisition activities could also profit from analytics.

Human resource

Adaptability of employees [Compatibility: High]

There was no evidence collected about an employees' resistance to adoption of technology. The interviewee perceives the adoption to be smooth. That could be due to the fact that the company has just started using the technology and also that the changes are developed and deployed within one department so a basis for communication and involvement of key stakeholders in decision-making process is provided.

Skills [Compatibility: Low]

A small group of people that are building predictive models require statistical skills that are present to a limited extent in the company. An end user is only required to trust data and use insights.

Due to more product orientation, the company has little in-house skills to conduct one-to-one marketing. Marketing has been done in bulk; therefore, people had to gain skills and to learn how to interact directly with a client. However, according to the interviewee, people tend to step in into unknown territory and are willing to learn new marketing approaches. This might be due to dominating adhocracy culture within the marketing team that leads to more risk-taking behavior.

Only a couple of people are assigned to innovate with analytics. It is too little to make major steps in innovation with analytics; however, due to a low budget there is no possibility to attract talent from the market aggressively. The only strong point is that the risk analytics department has provided a skill to start using analytics for marketing and without their help it would not be possible to start analytical activities in such a short period.

Relationships [Compatibility: High]

An internal departmental culture is dominated by adhocracy culture; therefore, people tend to be quite flexible. Moreover, the interviewee also accepted the fact that analytics requires presence of clan culture, because people have to share information and work as a team to enable customer support on all customer lifecycle. This is required due to a high level of specialization within the company that leads to the need to deliberately combine knowledge that resides within different specialized groups.

Moreover, right from the beginning of analytics deployment the company was able to gather the marketing, finance and control together to calculate costs associated with a customer per product group. It proves that the company is quite flexible and knowledge is being shared across departments.

Cognitive style [Compatibility: Moderate]

The marketing department has already been data driven to some extent, but marketers had to do all analysis manually. Analytics pioneers are trying to educate and convince in the usefulness of the models. However, a total switch to more analytical data-driven approach among marketers is still about to happen. According to the interviewee, the company realizes an importance of being data driven. The marketing management team is currently trying to improve the analytical orientation of employees by continuously showing how it works.

Physical resources

IT infrastructure [Compatibility: Moderate]

After a major change in the IT systems, the company has a small number of applications and a well defined structure of data warehouse. Moreover, all customer contacts are done through the company website; therefore, there is no problem with data integration and quality. In case a new application is added to a company portfolio, it costs a couple of days to create an adaptor from that system to the data

warehouse. According to the company's documents, the company has a quite standard set of applications that allow for greater flexibility. This decreases the time spent on the deployment of new functionality; therefore, the company is making fast steps in extending its analytics use.

However, existing analytical software is not compatible with the data warehouse. As the result, an analyst has to deploy models manually, which takes time and slows down the process. Due to that fact the company has currently decided to invest in analytical software that is more compatible with the current data warehouse. That will, however, lead to new costs concerning time and education.

Data quality [Compatibility: High]

According to company's documents, right from the beginning the bank was automating each department separately that has led to a collection of data by each department without sharing it. That prevented the bank from really monitoring the business. Therefore, the company decided to introduce a single data warehouse to enable the availability of data across the organization and to reduce the amount of IT applications to a very few. All of these changes have made it easy for marketing to start using predictive analytics and extend it, as data was already there.

Financial resources [Compatibility: Low]

The banking crisis has had a diverse impact on the company's profit and there are little financial resources still available. Moreover, as mentioned above, analytics is not a top priority for the company. Therefore, investments in analytics are hardly made. Also the inability to invest led to the adoption of analytics software that was available in-house. This software is incompatible with the current data warehouse and a lot of work has to be done manually.

Policies and practices [Compatibility: High]

The company bases its decisions on a value to the firm associated with a transaction between a customer and the company. In particular, cost versus benefits ratio is considered, which is influenced also by a forecasted customer retention period. The costs consist of operational costs, risk costs, capital costs, provisions, transaction and other costs. It took only a couple of months to analyze costs, meaning that the cost structure of the company is quite transparent because in most of the other cases this ability was demonstrated to a lesser extent. Knowing client related costs makes it clear to the company if the customer brings losses or profits to the company. Also knowing a lifetime value (e.g. retention probability for a number of years) helps companies to set higher priorities on clients that have a higher lifetime value and lower costs. That saves a lot of money and decreases customer search related costs.

The analytics development process is rather ad hoc and analytics is not seen as strategically important at the top. When a business question emerges, a database analyst spots the relevant data, which might answer the question, from the centralized data warehouse and uploads it manually into the SPSS statistics tool. With SPSS the analytics analyses the data and builds an analytical model. This model is manually being uploaded back into the data warehouse. Each month the marketer uses the models that are available in the

data warehouse to recalculate models' scores for each client. Further, there were no other evidence collected about practices and policies complementary to analytics.

Structure and processes [Compatibility: Moderate]

The company is highly centralized; therefore, it was quite easy to get an acceptance of technology within the organization. There was no long convincing stage of departments or units to use it. The principle "my boss likes it and I like it" has worked down the hierarchy.

The company is redesigning its business processes to be organized more around a customer value than around a product. Even though this change is desired, the process is still organized around the products and each person is responsible for marketing or sales of products. The process is focused on selling products, but now it is slowly moving towards the lifecycle of a client. There are responsible people assigned to acquire, develop and hold clients. The advantage of a product-oriented organization of a business process was that the marketing has specialized knowledge about a product that can be very complex. However, the disadvantage is that it is difficult to understand cross sell opportunities if each person is specialized on one product. Therefore, organization of the business process around a client helps to understand him better. So it can be clearly seen that a synergy between a client-oriented business process and analytics arise as they are more compatible with each other than analytics in combination with product oriented business process.

Corporate culture [Compatibility: High]

Clan culture was already there; therefore, it was easy for the company to collect knowledge for predictive analytics. Moreover, this is also supported by the fact that the company conducts a lot of cross-functional projects. For example, in order to set up predictive analytics at the marketing department, not only external consultants were hired, but also employees from the risk management department that had experience with technology were involved. The other example is that in order to calculate a client value, the company created a cross-functional team in a blink of an eye to define its cost structure. So the elements of a clan culture make it easier to share knowledge.

Strategy and top management commitment [Compatibility: Low]

The main strategy of the bank is cost saving and increasing the brand strength. According to annual reports, the company is planning to achieve cost savings by realizing synergies between insurance and banking business lines. The chosen tactic to achieve this is a reduction of administration costs in the branch network and improvement of internet-based services/products delivery. Moreover, the latter is being achieved by switching from traditional banking services to a full scale straight-through processing and alignment of business processes with customer needs. It is worth mentioning that the organization has made a switch from customer acquisition oriented to customer retention oriented which is more

compatible with analytics as it is difficult to extract value from data available about potential clients. The marketing department has just started looking at customers from a lifecycle perspective.

The Marketing Director is the highest sponsor of the initiative. Top management has other priorities than analytics and that impacts a scope of the company’s analytical activities. The intelligence department is not planning for expansion of analytical capability. According to the interviewee, IT does not have enough capacity to incorporate changes in the data warehouse that are requested by marketing. It all proves that analytics-driven marketing and customer orientation are not high priorities at the moment; therefore, this initiative does not receive enough resources to grow at a fast rate.

5.3.3 Competitive advantage

According to the interviewee, a Marketing Director was in a hurry to implement basic functionality. Taking into account that the company is lagging behind its direct competitors in one-to-one marketing and customer analytics, this might be a sign that analytical one-to-one marketing becomes a competitive necessity in the banking industry. The company has still not realized the value of analytics as the priorities now lay on cutting operational costs and switching to the virtual business model. In Table 5-7 can be found competitive advantage mechanisms in application to the case.

Competitive advantage	Case description
Bargaining power/ product features	There are no customer tailored products available within the bank. The customer is even not in a center of marketing and sales operations. All operations are centralized around a product that needs to be sold, not around a customer that requires some particular products.
Bargaining power/ switching costs	There is not enough functionality so far to provide personalized support. However, it is to a small extent achieved by sharper targeting of marketing campaigns. Therefore, those which are unlikely to be interested in a product are not ‘bothered’: “if we made a new product we wrote to all customers about this product... and now we look what clients are the most probable to be interested in that product and we write only to that small group”.
Efficiency	There was quite a big cost reduction achieved by tuning marketing campaigns with analytics. That directly supports the company’s strategy to be the most efficient bank in the Netherlands. Moreover, there is a complementary practice to base decision on costs associated with a customer per product. This practice helps to achieve a high value to the company while performing customer-related operations.
Effectiveness	It is difficult to judge if the company objectives were achieved due to only 1.5 year of analytics usage in-house. Moreover, the effectiveness is difficult to see as it is distorted by financial problems and lack of trust in banking that the company has got due to financial crisis.

Table 5-7 Competitive advantage mechanisms

5.3.4 Discussions

After redesigning their IT to improve a situation with conflicting channels, the company had a smooth start in using analytics. Employees were already data driven and also skills to start the initiative were already in-house within Risk Management department. However, there is a lack of skills to extend further functionality of analytics that is not going to be improved due to financial situation and low strategic priority. Moreover, the level of marketing skills is quite low and there is a need to learn how to conduct personalized marketing. It is worth mentioning that the adaptability of employees is difficult to evaluate if the company has started with small changes. Moreover, practices and policies compatibility is also difficult

to judge, because only if they are extremely incompatible and not changeable then it is possible to state that it is incompatible. It appeared to be difficult for the interviewee to judge if a policy or a practice helps to integrate a technology. Also relationship appears to be a result of culture.

The main advantage of the analytics so far was the improvement of decision making. A customer is better understood and the company is able to spot valuable customers that are likely to leave. The company is flexible and able to react fast, which makes it easier to retain its customers. However, due to functionality limitations, the company is not able to successfully cross sell and also web possibilities are not used.

5.4 Bank C case analysis

The bank is a major global bank of Dutch origin. It is part of a corporation that also has an insurance division. Historically the company has emerged from a merger of two banks (former Bank C and Bank D) that had different customer approaches. Bank D had no direct contact with the customer; therefore, it was forced to develop analytical capabilities in early years in order to survive. Bank C had rather a different strategy: it owned a dense network of branches. This close proximity to the client has led to a good knowledge about the customer obtained through direct interactions. In the 2006-2007 the parent company has decided to merge these two banks in one, which, according to company documents, was finalized in 2009. It was particularly difficult to merge the IT systems together and it took a lot of time to incorporate the analytical capability of Bank D into the merged organization.

The bank is divided into two business lines: retail banking and commercial banking. Retail banking serves private and small- and medium- enterprise sectors. Commercial banking business line is focused on medium- and large- corporations. According to annual reports, these business lines of the bank have different strategies in mature markets. The retail unit has a cost leadership strategy, while commercial banking is aiming at a diversification strategy. Retail banking business line aims to achieve more simplicity, reliability and transparency of its products. The commercial banking business line realizes its strategy through provision of highly tailored products for companies. The company has to re-gain trust that was damaged due to the financial crisis. Therefore, the main focus of the strategy at the moment is to gain trust through more simple financial instruments and deliberate efforts to increase customer satisfaction.

5.4.1 Customer analytics capability

Analytics capability is quite mature, but it still can be improved. All instances of analytics usages (e.g. risk management and marketing) are integrated in one department that is called customer intelligence. Customer analytics activities are organized mostly around campaign management, retention and cross-sale. Little analytics is done in the area of potential clients.

Ability to gather information [Score: High]

After years of data integration, all data finally rests in one data warehouse. By having all data in one place, time to search for information is reduced. It is easier to look at one place than to search through different data storages for information. However, the IT systems do not allow collecting all desired data, like the hobbies of customers. Also the ability to combine this data is moderate and there is little analytics done on combined data sources. The interviewees were aware of data available on the market from third parties. Taking it all into account, this capability is rather high.

Data source	Gathered	Used for analytics
Transactional data	+	+
Customer interaction	+	+
Descriptive customer information	Partly, not all desired data on lifestyle is collected due to IT limitations.	+
Response to marketing stimuli	+	+
Market research	+	-
Data about the usage of a product	+	+
Environmental scanning	+	+
Suppliers data	No suppliers	No suppliers
Score High		

Table 5-8 Information assessment

Capability to extract knowledge from available information [Score: High]

The company has inherited from Bank D a lot of in-house talent. Therefore, the customer intelligence department has high level of statistical skills. However, due to capacity limitations, not all required knowledge is extracted from the available information.

Degree of customer analytics assimilation [Score: Moderate]

As it can be seen from Table 5-9, analytics is being applied in most of the marketing areas. Moreover, the assimilation of this technology into daily work is very high and almost all decisions are either being based on data or tested on data.

Area	Coverage	Description
Pricing	Only tactical	No differentiation on pricing is done within the bank. Therefore, analytics is not used to define prices per segment. However, analytics is used to calculate aggregated price elasticity to define price on yearly basis per product.
Product development	No use	The company uses no analytics to tailor products. The products are tailored more based on qualitative research, which is not yet integrated with quantitative data.
Channel management	Retention	Analytics is used to predict the probability of churn in order to take an action in advance before it is too late. The decision is based on lifetime value of the client.
Selling	Cross-sales in form of recommendations	Cross-sale is conducted in all points of contact with a customer, including the customer service and the website. A suggestion of products to offer is based on which customer is likely to buy it, but also on which is more profitable to sell for the bank.
Market planning	Segmentation and targeting	All campaigns are based on data driven targeting. Moreover, the company is constantly trying to find new segments that they do not serve well.
Marketing	Monitoring of	The company monitors performance of campaigns with analytics to make

implementation	performance	a decision to stop a campaign if it is likely that it will not profitable.
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Table 5-9 Application of customer analytics

5.4.2 Compatibility

Environment [Compatibility: Moderate]

It is very difficult for the bank to acquire new clients due to two reasons: the bad financial situation in the country and the maturity of the Dutch financial market. The former can be clearly seen from annual reports, because right after the financial crisis the strategy has changed towards efforts on better customer retention programs. The latter was revealed during interviews and the line of reasoning here is that in an emergent market there are a lot of clients that are willing to purchase a product and they are not bounded by existing relationships with a competitor. However, in case of a mature market, clients that were willing to buy a product have already bought it and the acquisition of a new customer in most cases means 'stealing' him from a competitor, which is harder to do because a client induces switching costs. Therefore, Bank C is turning towards more retention and expansion of a customer's wallet share.

Moreover, due to the crisis, a lot of financial institutions, including Bank C, had to be financed by the government that had adverse effect on the company's image, according to the one of interviewee. A taxpayer sees this financing as money from own pocket and he/she is not happy with that. Bank employees believe that those banks that were not financed during the crisis are in a much better financial position and don't have a damaged image and so they are more trusted by the market.

Human resource

Adaptability of employees [Compatibility: High]

There was no evidence collected on resistance to change. Therefore, it is assumed that the adaptability of the employees is high. Moreover, the interviewees revealed to be very eager to deploy more and more new analytical functionality.

Skills [Compatibility: High]

A small group of modelers does require having robust statistical skills, which is available in-house, in order to be able to build complex models. The customer intelligence department has adopted SAS technology that requires a high level of statistical skills, that serves as evidence that there is enough statistical skills in-house.

According to the customer intelligence manager, there is little need for the marketing department to have specific skills. However, the marketing department would prefer to have basic skills to query the data, because due to a limited resource capacity of the modeling department, not all requests are satisfied and a lot of work could be done faster. Moreover, one-to-one marketing and sales were already advanced in Bank D for more than a decade ago. The customer service department has got trainings to get selling skills that are necessary in order to enable that department to conduct cross-sales activities suggested by analytics. Also management skills are good, because of two reasons: good skills to come up with policies and

practices to overcome incompatibilities; it took only 2-3 years to integrate Bank C and Bank D, which is impressive considering a big size of the company. Therefore, even though there is still small room for improvement, overall skills are very high.

Relationships [Compatibility: Moderate]

The big size of the organization has an adverse effect on the relationships within the company, because due to a high number of employees, people do not know each other very well. This leads to less information sharing. However, the company has excellent processes in place to boost sharing of customer-related information (see policies and practices). Moreover, the promoted clan culture also boosts knowledge sharing.

Cognitive style [Compatibility: High]

The company has realized that a “data-driven mindset” of a user is extremely important, because it has direct consequence on the use and also the generation of new ideas of analytics use. According to the marketer, analytical cognitive style leads to more curiosity and trust in the data. It is interesting to mention that being data driven does not lead to less gut feel use in daily work. It even increases its importance: “I go on my intuition and if you know the data, then you become more creative through the data. Data can teach you a lot of things”.

Bank D had been data driven for a long time already, while the employees of Bank C have recently made a switch from completely intuitive to a more data driven decision making process. According to the customer intelligence manager, it was a shock and there was a resistance to change by Bank C employees. However, in order to minimize it, the most marketers and customer intelligence employees were composed of former Bank D employees.

Physical resources

IT infrastructure [Compatibility: Moderate]

Due to the decision to merge, the IT infrastructure has been subjected to integration over the last 3-4 years. And only for the last year it enjoys standardized IT systems and integrated data. The only negative point that was discovered during the interviews is that the company has automated their workflows too strict and departments that have direct contact with a customer cannot fill in additional information into the IT systems. This information is acquired during contacts with the client, but at the end not shared with the marketing department. It was revealed during the interviews that soft information is very desired by the marketing department. Taking into account that the IT infrastructure integration was finished recently, it is hardly possible that it would have already had its effect on performance in the recent years. Performance for this year was not yet measured. Therefore, compatibility is judged considering its state in the last 2 years.

Data quality [Compatibility: Moderate]

After lot of years of data integration, the quality of the data is high. All data is fully trusted by departments that are using it. However, the completeness of the data could be improved. For example, the marketing department still lacks important data such as emails, hobbies, etc.

Financial resources [Compatibility: Moderate]

Due to its big size, the company has enough financial resources to invest in analytics. However, due to the financial crisis the company had to borrow money from the Dutch government and the main priority at the moment is to cut costs. This strategy leads to the actions that decrease value to the customer and even eliminate the bank receipt, the only link between a customer and the bank.

Policies and practices [Compatibility: High]

Current policies and practices help to overcome some of the problems associated with company inertia due to its size and structure. Clearly defined contact persons help to develop interdepartmental relationship and improve sharing of information. This helps to build relationships within the organization across functions and optimize information flows. It concerns all involved into customer contact departments: customer service, sales, marketing and customer intelligence.

The other important policy relates to incentive schemes for sales people. Sales people are deliberately paid more if they sell products of higher priority. These priorities are communicated on regular basis to the sales team. So that the sales force has incentive to sell not only the products that are the easiest to sell, but also products that are important for company business (based on strategic intent or profit maximization).

The other important practice is aimed at overcoming conflicts that arise from a mixed organization of customer business processes (e.g. around segments and around products). It leads to conflicting offers from product and segment marketing departments. In order to avoid these conflicting messages, the company has decided to only use inbound customer interaction channels to make extra offers. Outbound customer interaction channels are used strictly on event-basis (ongoing offers). Inbound channels are used for cross-sales and, in order to avoid conflicting messages in these channels, a customer gets first an offer that he/she is most likely to react on and which is the most profitable for the company.

The weak point of practices is that there is no standard on how marketing and sales should be done. For example, the interviewed marketer did not even know how other marketers are working. Moreover, there is no process set on how to share information about new models available for use. Now only people that have requested it might know about it. The interviewed marketer showed a lot of interest in knowing more about available models, but she could not get such information anywhere. That leads to less realized synergy and less intensive usage of analytics possibilities.

Structure and processes [Compatibility: Moderate]

Historically the company has gone through a number of mergers and acquisition leading to a lot of different IT systems and data storages. Many years the company was trying to integrate data and to

standardize IT. The effort required to do that was enormous. That took a lot of attention and distortions in innovations with analytics. However, since 1-2 years the company is centralized and integrated. The company has taken a successful model of formalizing work processes from Bank D. However, the centralized structure together with the big size makes it difficult to spread information and also to innovate fast.

The company has a mixture of product oriented and segment oriented organization work. Product orientation takes care that tactics are developed to sell the most profitable products, while the organization around segments takes care that the marketing and sales recognizes when and which customers are willing to buy that product. The switch to the Bank D model of organizing was a big shock for Bank C, because its business processes were completely different and it took time to adjust them. According to the customer intelligence manager, due to this business process limitation, the company still organizes its activities based on changes within the company and reacting rather than proactively acting on changes that happen with a customer. Therefore the company is planning to redesign its business process around the client lifecycle.

Corporate culture [Compatibility: Moderate]

The culture of the organization is a mixture of a market culture and a clan culture. Market culture leads to profit maximizing behavior, while team culture boosts sharing information that is necessary in analytic-driven customer processes. That leads to invention of policies and practices that help to increase information sharing. However, due to its big size, the company is not able to develop a clan culture to a great extent. People simply do not know what is happening in other departments, because the organization is too big.

Strategy and top management commitment [Compatibility: Moderate]

According to annual reports, the company has two dominating goals: to cut costs and to become customer oriented. These goals conflict with each other, because whenever a long-term decision should be taken that increases short-term cost, a conflict arises with cost cutting strategy. As an example could be a monthly receipt that was sent to the youth segment in the past. It is calculated by the marketing department that the customer is 60% more likely to be a lifetime client of the company if he is a client from early ages. In order to be visible to the client from his early ages, the company needs to send him receipts every month as it is the only point of contact with such a customer. However, the department that is responsible for cutting costs has decided not to send such receipts as they are too expensive and so sacrifices the long-term goal of the company. So the customer orientation is still incompatible with the other part of the strategy – efficiency. Being customer oriented is profitable in the long term, while in the short term it costs money. Therefore costs of customer orientation conflicts with cutting costs strategy. This leads to short sight decisions.

The company's manager believes that a clear vision and strategy about analytical marketing and sales is very crucial for success. The marketing director is fully committed to analytics and he has a seat in the board of directors.

5.4.3 *Competitive advantage*

Predictive analytics is seen as a technology that is crucial for survival. It enables the company to differentiate by being customer oriented. Analytics technology provides additional knowledge; however, it is also important what departments/people do with this knowledge. The company recognizes that it could do a better job not only in collecting information and analyzing it, but also how this knowledge is used. In addition, there are also hidden benefits of analytics, such as a decrease of discussion time because data are hard and a lot of speculation is avoided. The other hidden benefit is that employees can learn based on data and test new ideas before implementing them. In Table 5-10 can be found competitive advantage mechanisms in application to the case.

Competitive advantage	Case description
Bargaining power/ product features	The company does not tailor products with analytics. However, data driven culture indirectly helps to boost knowledge about a customer and that leads to better products.
Bargaining power/ switching costs	The company uses data to build relationships with their clients. For example, it provides free services to young people so customers become familiar with the company from early ages. By choosing services at a familiar company, a client will avoid having economic risk costs, associated with another company, and search-related costs.
Efficiency	Analytics technology has helped to cut marketing costs considerably by targeting a group for marketing campaigns in a more efficient way. Also analytics approach has led to better decisions through knowledge improvement and the ability to test new ideas. Therefore, less money has been spent on things that are clearly not successful.
Effectiveness	Customer orientation helps to increase customer value, which can, however, disappear in case of a negative resonance in the media. However, all achievements that are gained by customer orientation disappear due to negative media attention. Interestingly, interviews with other banks revealed that they all believe in the company's success.

Table 5-10 Competitive advantage mechanisms

5.4.4 *Discussions*

Usage of analytics enables the bank to not only cut costs on marketing, but also to improve sales and to differentiate through a personalized customer approach. It takes time to learn how analytics can be used in innovative ways. For example, an event-driven process is desired, but it is difficult to realize as it requires more knowledge and more tight feedback from the user. Moreover, the company historically has had to go through a major merge that slowed down analytics innovation process. However, an advantage was that the skills were already in-house, inherited from Bank D.

It is worth mentioning that it was also difficult to judge the adaptability of employees due to preexisting experience with analytics at Bank D. The employees of Bank C were hardly included into the new merged customer analytics part of the organization. Moreover, policies and practices seem to be the result of good management skills to overcome organizational issues that arise from its big size. Relationships are

negatively affected by a big size, but compensated by a team-oriented culture and by above mentioned policies and practices.

5.5 Banking industry cross case analysis

In the literature the distinction is made between the general environment of a company and the industry environment (Grant, 2009). Environment factors shape the industry environment and they include technology, economic conditions, laws and policies.

Technology

The Dutch market has good access to technology. However, during the case search process, it was identified that US firms are pioneers in predictive analytics adoption, while Dutch companies are lagging behind in it. There are a number of software packages available to conduct analysis on data. However, SAS and SPSS are the most used ones. Moreover, Unica (a developer of a campaign management tool) is creating a user friendly tool to develop simple models. These software packages have a good quality, including a good quality of its maintenance. It is worth mentioning that SAS requires deep statistical knowledge, while SPSS is very easy to use, even for a non statistician. Therefore SAS provides more sophisticated analysis than SPSS. Unica is even more easy to use, but its functionality is limited to simple predictive models that are related to a campaign management.

Economic conditions

After the crisis of 2008-2009 the Dutch economy is still recovering. Financial institutions were adversely affected by the crisis. One bank (DBS) went bankrupt and the other (Fortis) would also go, but the Dutch government decided to (partly) nationalize it. Moreover, the impact of the crisis on the Netherlands comes from other European countries. Due to one currency, financial problems in other European countries also had impact on the Dutch economy, which had an adverse effect on the banks.

Laws and policies

The Basel 2 regulation is the most important policy for the banking industry. This regulation concerns risk and capital management requirements that ensure that the bank holds enough capital reserves to cover a risk of conducting its investment activities and it increases entry barriers (Boot, 2007). Due to the crisis, the Basel 2 regulation requirements are getting stricter, which decreases the amount of money that banks can invest to earn revenues. This decreases the profit margins; therefore, a lot of banks have to cut costs even more. In addition, the compliance with Basel 2 regulation requires developing analytical capabilities for prediction of risks associated with investments.

5.5.1 Banking industry analysis

Environmental factors shape industry environment, which includes competitors, suppliers and customers. The Porter's Five Forces framework is used to analyze an industry environment. Even though Porter's theory (1985) is considered as a competing theory to resource-based view, it is a useful framework

to analyze a firm's environment. This is important considering the fact that industry characteristics influence organizational decisions concerning its resources and capabilities. Porter has suggested that there are five forces that affect competition within a particular industry: threat of new entrants, threat of established competitors, bargaining power of buyers, bargaining power of suppliers and threat of substitute.

Threat of new entrants

Profitable markets attract new entrants that results into lowering of margins for the whole industry. This can be avoided by making higher entry or exit barriers. In the banking industry due to Basel 2 regulations, there are quite high capital requirements. Banking industry in the Netherlands is low cost in comparison with the other countries (Boot, 2007). In order to keep costs low, an organization has to have a scale and it acts as an entry barrier. The other barrier is the agreement of the Dutch banks to share ATMs free of charge for its customers. In case a new entrant would want to enter the market then it would need to renegotiate ATM usage or to provide a sufficient amount of ATMs. Bank shops is particularly important in the Netherlands as a distribution channel (Boot, 2007). In order to compete effectively in the Netherlands a new entrant would need a good network of bank shops, either own or franchises. Therefore entrepreneurs cannot easily open a bank; however, it is possible to provide some services such as payment services. Moreover, exit barriers are also complicated due to externalities between financial institutions and government regulations (Boot, 2007). If a financial institution fails then the whole financial system is negatively impacted; therefore, government intervenes if a bank is instable and too big to fail. Fortis could be a good example of government intervention in the Netherlands.

Threat of substitutes

The more substitutes there are for a product, the more there is a risk that a customer may switch to these alternative products. Airline and railway industries are a good example of substitutes, because a customer can choose to travel by train or by plane. There are a lot of substitutes in the banking industry. All financial institutions provide services that overlap with the banking services such as insurance, mutual funds, fixed income securities, etc. Moreover, a lot of corporate companies are choosing to support their clients financially by providing loans for their products. For example, General Motors provides loans for its cars at a smaller interest rate than banks. It is worth mentioning that virtually all banks in the Netherlands were operating as a single entity with an insurance business unit. However, due to the crisis and a change in laws, most of them have decided to split up, legally and financially, the banking and the insurance business lines to minimize risks and to comply with Basel 2.

Bargaining power of buyers

There are two major types of buyers in financial services: consumers, and small- and medium-enterprises (SME). In other countries but the Netherlands switching costs are very high (Boot, 2007), which

in turn decreases bargaining power of a buyer. However, due to the current regulations, switching costs in the Netherlands are very low and it is quite easy to transfer mortgages and other services to another bank (Boot, 2007). Moreover, information is freely available through internet; therefore, searching costs for alternatives are very low. That increases the bargaining power. Business-to-business (B2B) segment in the Netherlands has another situation. SMEs experience a very strong lock-in with their house banks.

Bargaining power of suppliers

In the banking industry a major type of a supplier is a capital supplier. The power of a capital supplier is quite weak due to standardized procedures to rate banks for their credit worthiness. Therefore, a supplier would look mostly at a credit rating of a bank that is calculated by specialized agency. This credit rating reflects a riskiness of debt and it defines a percentage that the bank has to pay for borrowing capital. Thus, the higher the credit rating is, the lower the costs for the bank. Credit ratings of major competitors in the Netherlands do not differ considerably and, according to Standard&Poor's, they are ranging from AAA to A-. It is worth mentioning, that during economically stable times there is a big number of capital suppliers available; however, during downturns financial institutions do not supply capital to each other easily.

Industry competition

The considerable majority of the market share belongs to four companies (Boot, 2007): Bank C (merged with Bank D), Bank A, a bank not included in the research and, to a lesser extent, Bank B. The first three banks are of comparable size and they have international presence. Moreover, due to the low bargaining power of the SME market, the competition in that market is almost non-existent; therefore, companies concentrate on increasing a customer's wallet share and cost optimization instead of customer acquisition. As was mentioned above, it is different for the consumer market. Consumers switch easier than SME and it is normal to have a number of services within different banks. Therefore, the competition has an oligopolistic nature (Boot, 2007). The Dutch banking industry is a mature market with low switching costs for consumers due to government regulation. Moreover, in the consumer market, companies propose the same type of products and it is very difficult to differentiate on product features. This difficulty stems from the fact that financial services are easy to copy and to understand. Therefore, the only way to differentiate is actually by providing a superior customer experience. Due to the requirement to the scale of operations, it is hardly possible to differentiate (segment) consumers without the use of predictive analytics technology. The industry is a low price industry specifically in the Netherlands; therefore, cutting costs is important for survival.

5.5.2 Customer analytics capability within banks

Ability to gather information

None of the banks scores low on this capability, because all of them have gone through major IT projects to integrate data and decrease the amount of IT systems. Moreover, also skills of employees are very

important for this capability. Bank B scores a little lower on this capability than the other two banks because it lacks knowledge on what data to collect.

Capability to extract knowledge from available information

Bank A and Bank C are quite equal on the capability to extract knowledge from the available data. However, Bank B is the least advanced, because it has little in-house talent available for customer analytics. Moreover, it has just started its journey on learning to use analytics for its business needs and still more knowledge is required on which kind of business questions analytics is able to give an answer on.

Degree of customer analytics assimilation

All three banks go through similar steps in analytical development. They start from short-term cost cutting by tailoring marketing campaigns and then move towards more complex predictions and analytics use. The banking industry does not discriminate on price as much as, for example, air transportation or hotel business industries do. Therefore, analytics technology is used only for pricing from time to time in order to make annual decisions on price setting by calculating (predicting) price elasticity for each product.

Product development is also not a top priority due to a number of factors. First of all, because of the financial crisis, the banking industry is aiming towards simplifying its financial instruments. It is difficult to calculate risks associated with complex financial instruments and a lot of economists believe that complex instruments were one of the reasons of the financial crisis. The interviews also have revealed that companies are trying to simplify their offers.

Channel management is improved by targeting only customers that are the most likely to respond to a campaign. Bulk campaigns lead to irritation and decrease in value to a customer. Therefore, if outbound campaigns are sent only to a limited amount of customers that are the most likely to react, then a risk of irritation is minimized. Moreover, Bank C has even decided not to do large outbound direct campaigns. The only contact initiated by the bank is conducted based on known triggers (facts) such as reach of a pension age by a customer (ongoing campaigns). The other thing that is done in the channel management area is trying to predict when the customer is likely to churn. Knowing in advance that a customer is likely to churn provides a time slot to act in order to keep that customer. Some companies are trying to keep a customer by providing big discounts or by selling products that a customer is most likely to buy. So it is important to have resources that use this knowledge to keep the company's customers. By understanding the customer, the company is able to make informed decisions on how to increase value to a customer. However, each company has a different ability to respond on this enhanced knowledge. Not all cases were able to answer the question about their possibility to respond to major changes in customer behavior. However, a couple of cases have a reaction speed in the range of 1 week (Bank B) to over a month (Bank C). Moreover, these cases related this speed to their size, claiming that a bigger company has more inertia in any change process.

Analytics is a powerful tool to discover patterns in data that predict customer behavior, such as predicting what a customer is likely to buy. This cross selling is successfully used within Bank A and C, while Bank B is lagging behind. In order to be able to predict the next best offer, a company needs to have a historical record, so that cross selling has to be conducted for some time before it can be predicted. Bank B historically has done little cross selling; therefore, the company has not enough data at the moment to find reliable predictors. The prediction of what a customer is likely to buy helps to reduce customer searching costs and also enables extra channels (e.g. customer service or website) to sell products in a personalized way. It is one of the most attractive areas for financial services as they have a lot of products (financial services) to sell, but, due to a huge amount of clients, it is difficult to keep record of when a client is really searching/waiting for a particular product. Analytics technology enables a company to be proactive and show a customer that the company understands his/her needs. This helps not only to increase revenues, but also to increase value to a customer.

Market planning capability is improved by finding more segments that are not served well. Moreover, it also helps to find clients that are the most likely to respond to a campaign. Analytics enables testing new ideas and predicting if a certain campaign would be a success.

Marketing implementation capability is boosted by enabling an ability to monitor campaign performance. It is possible to monitor the performance without analytics, but only if a company does not do other activities but one campaign. This is rarely the case in reality. Analytics helps to detect patterns that are related to a particular campaign and it helps to eliminate other noise, such as other campaigns or actions. Furthermore, after achievement of the ability to identify the performance of a campaign and the collection of data about past performances, companies go further and try to predict if a future campaign will be successful. This helps to save costs by minimizing risks associated with unsuccessful campaigns.

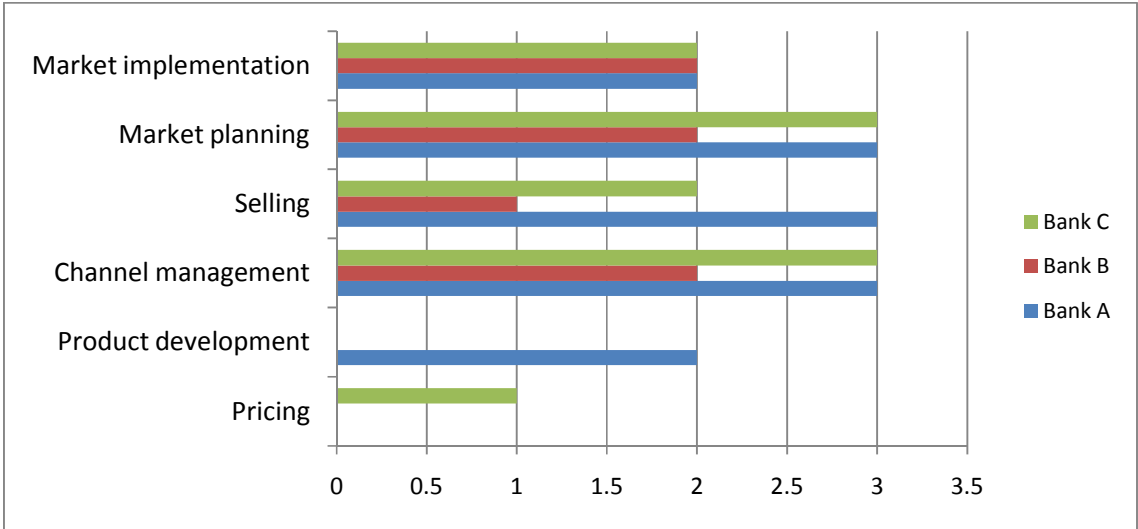


Figure 5-1 Comparison of assimilation areas of customer analytics

Figure 5-1 compares the three banks in how far analytics technology has assimilated. The scale used is ordinal and has no fixed intervals between the numbers (0 – not used; 1 – little use; 2 – used regularly; 3 – used extensively). All three banks still did not exhaust analytics possibilities and have room for improvement. As it can be seen from Figure 5-1 Bank A outperforms other banks on areas of analytics assimilation. Bank B is the least advanced.

5.5.3 *Competitive advantage*

Taking into account the analytical ability to boost the market-related sensing capabilities, analytics is able to provide competitive advantage through three mechanisms: increase of bargaining power, increase of efficiency of marketing campaigns and sales efforts, and increase of effectiveness of marketing to serve goals of a company.

Bargaining power is improved by increasing the customer value of a company. The research conducted by Rijksuniversiteit Groningen et al. (2011) revealed that Bank A is the best at providing value to the customer for the last two years (see Table 5-11). Interestingly, Bank B and Bank C were relatively the same in providing value to their customers in 2010, even though Bank C was further away with analytics assimilation. This might relate to a negative publicity of Bank C in the media over the last couple of years, which, according to the interviewees, had a negative impact on its brand equity.

Value to the company is the highest at Bank A and it is the lowest at Bank B in both years.

Company	Value to the customer		Value to the company	
	2010	2011	2010	2011
Bank A	63.6	57.8	45.4	54.2
Bank B	53.9	47.1	35.6	41.9
Bank C	53.7	50.3	42.9	42.4

Table 5-11 Customer performance index

As it can be seen from Table 5-11, only Bank A differs in value to the company. In addition, value to the customer has decreased, while value to the company has increased over the last year. Also in the last annual reports there is more stress on cost cutting than in previous years. This might mean that the companies have made a switch from delivering more value to the customer towards more extracting value from its customers.

5.5.4 *Analytical capability and competitive advantage*

Taking into account analytical capability, the cases differ in analytical capability. Bank A is the most advanced and it is followed by Bank C, while Bank B has a lowest analytical capability. As was mentioned in operationalization section, competitive advantage is represented by two measures: value to a company and value to a customer. Bank A outperforms other two cases in all represented years (see Table 5-11). Bank B and Bank C are close to each other. However, Bank B is scored considerably lower on one of these two variables (in 2011 – ‘value to a customer’ and in 2010 – ‘value to a company’ are lower than in case of Bank

C). Therefore, Hypothesis 1 is supported for the Dutch banking industry, because a company that is better on analytics capability outperforms the others.

Sustainability of advantage

As it can be seen from Figure 5-1, Bank A is the most advanced in building analytical capability. It takes a long time to learn how to use analytics, to learn what data to collect and also to collect the actual data. Therefore, analytics is a subject to resource accumulation effects. Moreover, analytics is built on top of other resources that are difficult to imitate, such as data repositories, human resource and cultural resource. There are three basic mechanisms to evaluate the ability of a resource to be duplicated: visibility, complexity and uniqueness. Analytics by itself is not visible to the outside world as it is a custom made solution. Moreover, it is not directly observable also because it is hidden in other resources and there is no single point of understanding, which makes it complex. In order to explain this point a bit more, a comparison with CAD systems can be made. The understanding of CAD systems comes easily if it is used regularly, because its major functional part is inside of the software package visible to the user. However, by definition analytics is multifaceted: it is by itself used in a lot of applications such as CRM system, campaign management system, website, etc. Only a customer intelligence department might have an overview of what the technical scope of analytics is. Moreover, in a lot of cases, analytics by itself is a technology that has no value without an ability to use knowledge delivered by analytics.

Interestingly, from the interview data can be seen that in the past a part of Bank C (i.e. Bank D) was more advanced with analytics than Bank A is, but it had to stop innovating with it for a couple of years due to a huge merge it had to go through. It has led to lost time and the opportunity to outperform Bank A on analytics.

Moreover, compatibility between analytics and organization also plays crucial role in the sustainability of the advantage. Even if a company starts the earliest with analytics (as Bank D did) and gained knowledge, incompatibility (after merge with Bank C) slows down innovation and gives an advantage to a competitor in terms of timing to implement analytical systems.

5.6 Telco case analysis

The company is a large global telecommunication company providing internet, telephone and cable television services. It is a subsidiary of a large publicly owned media company. The parent company buys and sells telecom-related companies worldwide on yearly basis. That causes very strong commercial focus within all its subsidiaries. After a deregulation took place in telecom industry in the Netherlands, the competition in this industry has increased. The deregulation has lowered substantially entrance barriers. Even though there is still a limited amount of competitors, the company is expecting it to change in the near future. The management believes that two things are necessary for company survival: customer orientation and innovative services. In a market with high competition and mass-market orientation,

customer service is seen as a very important mechanism to differentiate. Customer relationship initiative enhanced by analytics was started right after the deregulation took place.

5.6.1 Customer analytics capability

Ability to gather information [Score: Low]

The company has a lot of difficulties with gathering information. First of all, IT systems were developed in a way that it is very difficult to extract and integrate information. Due to the organization of business processes around services, all information is being stored on an aggregated level per service and it is very difficult to combine information from different service lines. The managers of many business units cannot even identify if a customer is an existing customer or a new customer. Data is spread across different data storages; therefore, it provides little ability to combine it properly. Also the information assessment (see Table 5-12) suggests that the ability to gather information is low. It is worth mentioning, that the management is aware of the existence and quality of data sources offered by external parties.

Data source	Gathered	Used for analytics
Transactional data	Partly, not integrated	+
Customer interaction	Partly, not integrated	+
Descriptive customer information	Only demographics data for customer acquisition	+
Response to marketing stimuli	+	+
Market research	+	-
Data about the usage of a product	-	-
Environmental scanning	Only scanning of regulations	-
Suppliers data	-	-
Score Low		

Table 5-12 Information assessment

Moreover, due to financing limitations, there is little done to improve IT and to extend an analytics department. Modest in-house skills have led to a decision to outsource. To sum up, there are too few skills and too little financial resources to improve the analytics capability.

Capability to extract knowledge from available information [Score: Low]

The state of the capability to gather information leads to a less steep learning curve. And instead of improving knowledge about analytics technology, people have to find a workaround to cope with bad quality of data. It is also supported by the fact that the company has more models to cope with data quality and infrastructural issues than it has predictive models.

Degree of customer analytics assimilation [Score: Low]

The functionality depends on market conditions where a business unit operates. Different business units have different analytical capability. This capability is high in the Netherlands and analytics is used often to make tactical decision, but in Central European units this capability is from very low to non-existent.

The company uses analytics in all outbound marketing channels (campaign targeting). However, only one inbound channel, i.e. field sales, uses analytics to predict a cross sale opportunity. Call center and inbound telesales are on the agenda of the company, but it would take time to deploy it. The company also

uses ongoing marketing campaigns that are triggered by the basic information that was collected about its customers. Table 5-13 provides an overview of the assimilation of analytics in the Dutch business unit.

Area	Coverage	Description
Pricing	-	
Product development	-	
Channel management	-	
Selling	Outbound sales opportunities	There are little instances of using model scores for the sales process. The company desires to implement recommendation IT systems for inbound sales and customer service shortly, but only across four markets.
Market planning	Segmentation and targeting	The analytics technology provides segmentation of the client base across two dimensions: propensity to churn and propensity to buy a particular product. This provides an important input for outbound sales and marketing which saves a lot of money.
Marketing implementation	Marketing performance	Analytics helps to monitor marketing performance. IT systems and work processes are not transparent and it is virtually impossible to monitor marketing performance without analytics.

Table 5-13 Analytical marketing capabilities

5.6.2 Compatibility

Environment [Compatibility: Moderate]

The company experiences different customer focus depending on the particular market. For example, in the Austrian telecom industry the churn rate is very low; therefore, there is no need to spend money on customer retention. Growing markets require more attention to customer acquisition and retention is not that important. The saturated Dutch market provides little possibilities to extend a share of wallet and the company is concerned with retention and acquisition. Expanding current customer relationships in the Netherlands is very hard, because Dutch consumers already have subscriptions to almost all types of the company's services.

Moreover, in case of acquisition focus, the company needs 3rd party data and even within Europe the availability and quality of such data varies. Even the quality of postal systems varies per country and that provides difficulties with outbound marketing campaigns. For example, in some countries a household is not identified by a street and number, but rather descriptively referred to as "green house with two windows around the corner".

Also the skills of a marketing department to perform one-to-one marketing are important. In the past marketing was not personalized. However, marketing practices have changed and more markets switch to direct marketing. Therefore, if direct marketing is not practiced in a particular market then skills are not yet available on that market. In the Netherlands, the market is mature and it is a common practice to have a direct contact with a customer.

Human resource

Adaptability of employees [Compatibility: Low]

There is a lot of resistance to adoption within the organization. There are a number of reasons for that: incompatible incentive schemes, decentralization of decision rights, lack of financial resources, etc. These complements are discussed below.

Skills [Compatibility: Low]

As it was mentioned above, the level of analytics technology skills is low; because all efforts aim to overcome the IT infrastructure and data quality barrier. Moreover, the company has only 2-3 persons responsible for the analytical capability all over the world. Therefore the capacity to innovate is restricted due to limited resource availability. The company copes with it by setting priorities and by ignoring noncritical issues.

The firm has different levels of marketing skills in different business units. It is difficult to deploy advanced analytical capabilities if a marketing department itself is not mature: “.. [we look into] how developed skills of the marketing department. If the marketing department does only above the line marketing [conventional form of mass media], then you can forget about analytics”. According to the interviewee, marketing capability is mature only in the Netherlands and 3 other countries out of 10 countries where the company is present. The low level of the other 6 countries does not let the company to introduce analytical capabilities to the desired level. By looking into the innovation deployment process of the company, it appears that the mature countries are the first in the queue of the customer analytics adoption. It might be due to easier deployment of innovation in case of more skilled business lines, because there are less resistance and less need for training.

Relationships [Compatibility: Moderate]

The firm is a unique case, where the central organization has more knowledge about the customer than the workforce that directly is involved in the customer contact. Due to the incompatible IT systems the workforce has no overview about the single customer and the central organization analyzes the data to overcome it. This information is then passed from top to bottom. There are some instances when intangible knowledge about the customer is passed bottom-up. Moreover, sales force resists providing feedback to marketing intelligence department. Therefore, there is a lot of room for improvement, but due to the relatively small size of the organization, information easily flows from person to person, which is supported by the fact that the manager being interviewed knew the marketing employees quite well, despite of the geographical distance.

Cognitive style [Compatibility: Moderate]

The organization struggles with intuitive cognitive style of sales force. Sales people are more intuitive people; therefore, they resist the most to use insights in their daily tasks. Due to that, the firm has to always re-check if sales force uses analytical insights or not. A lot of time is spent on double checks and

convincing. Moreover, hard checks based on data show that there is little trust between management team and sales team.

Physical resources

IT infrastructure [Compatibility: Low]

Analytics adoption is an ongoing process with planned extension activities across the business lines and countries. Performance of the models is being monitored on a monthly basis and, in case of bad performance, a change is being scheduled. However, big changes are difficult to roll out due to the non-standardized infrastructure. The company suffers from past decisions to adopt different CRM systems for different business units. It makes the deployment of changes “a nightmare” that costs a lot of time and money. It is one of the major barriers to the adoption of analytics for the company.

Due to the limitations of their IT infrastructure, it is almost impossible without analytics to see if the customer that is buying particular product is an existing customer or a new customer. The company uses analytics to mine this knowledge; therefore, with analytics, the company gets more understanding about the customer. Analytics is integrated into the customer related software. Due to the technical problems, the organization cannot deploy analytical innovations fast. There are a lot of databases and IT systems involved that are not compatible with each other. Moreover, it sets restrictions not only on deployment time of analytics, but also it is costly to make a major change.

Data quality [Compatibility: Low]

The company has a lot of problems with their data. Data is spread across different applications and it has a poor visibility across business units. Therefore, the data quality is very low. There is no central data warehouse, but instead there are two separate data marts. One is used only for mature markets to make selections for marketing campaigns, where a subset of data is gathered that contains transactional data, data about the services or customer interaction data. The other data mart is used for almost all businesses to get an integrated customer view. Internal data quality is one of the major barriers to adoption of customer analytics. A lot of data is missing, such as a unique customer ID that links a particular customer to its transactions. This leads to a lot of workarounds in order to extract such information. Moreover, the company did not collect data in the past on customer demographics that are very important for customer behavior predictions. Instead of infrastructure redevelopment, the company uses analytics to dig information from their dispersed IT systems: “some markets can already see in their sales data how three products are linked to each other and how many bundles we have sold. Some countries cannot even see that right away”. That makes them inflexible in introducing innovations with analytics.

Moreover, external data is very important in order to make use of predictive models for customer acquisitions. Very often external data is not available or has a low quality or is too expensive to purchase.

Financial resources [Compatibility: Low]

The marketing intelligence department receives an insufficient budget. In case of other higher priorities, the deployment of innovations has to be postponed.

Policies and practices [Compatibility: Moderate]

There is a tension between the sales and marketing department due to misalignment of their performance measurement practices. The marketing department is being measured on achievement of strategic goals that include the sales of particular products. However, the sales department is measured on how many products it sells without considering strategic importance. Therefore, the marketing intelligence department has to put a lot of efforts to resolve this conflict. The most important cause of such misalignment is that it is virtually impossible to measure margins the company earns on a particular product.

There is a clearly defined practice in the organization that helps to overcome problems associated with resistance to change. In order to convince each business unit, the organization demonstrates how analytics work. It is done by providing functionality in an incremental way and by teaching employees how to interpret the results. Also it is important that a business unit understands the impact of the usage of analytics in the context of the whole organization. In case the business line thinks it's useful, the central organization tries to integrate the data and develop the functionality to cover all customer lifecycle for ongoing campaigns (e.g. churn prediction and the course of action to react on it). Involvement of key stakeholders at the early stages is also discussed in scientific literature as a good practice to overcome resistance to change (Hong and Kim, 2002).

It is practiced within the company to communicate frequently between customer intelligence department and the business line departments. In that way a two-way communication occurs and information is being shared that is valuable to both sides. Marketing intelligence department gets the feedback about the customer, which is extremely important knowledge. The business unit in turn gets insights on what are the practices among the other units and countries.

Structure and processes [Compatibility: Moderate]

The company is highly decentralized and the decision rights completely belong to the business units. It is difficult to deploy analytics, because a decision must be taken for each business unit separately. Even though the top management is very committed, there is still a big degree of resistance within the business units: "from our side we cannot force them anything. Business lines are responsible for the profits, they are responsible and not us. So at the end of the day it is their decision".

The company's business processes are still organized around services rather than around customers. For example, some business units are still unaware if the new subscription to the service is a new customer or an existing customer, because collected data provides mainly information on the level of service sold per business line. The company does not know what margins it earns per customer on certain products. The

largest difficulty is in an unclear cost structure of products. The cost structure is not reported on product level, but more on the aggregated business line level. Therefore, it is difficult to evaluate the value of a customer to the company. Moreover, employees tend to focus on issues such as how many subscriptions a certain sub-department has sold and not focusing on increasing a share of wallet of a customer. However, the company has reorganized the marketing function by assigning people to be responsible to customer retention.

Corporate culture [Compatibility: Moderate]

The company is very commercially driven. This market culture is caused by actions of the parent organization. As it was mentioned in the background information, annual reports show that the parent company sells and buys telecom companies all over the world every year. Therefore, each subsidiary has to perform well, because otherwise it will be sold. This type of culture might be a reason for the adoption of analytics and customer-orientated approach just after the deregulation of the telecom industry.

In the past the company has tried to work in the mode of separate marketing and customer relationship management. However, it did not work and the company had to change in order to succeed. Therefore the company strives to increase elements of the clan culture to boost the sharing of information.

Strategy and top management commitment [Compatibility: Moderate]

The strategy of the firm is changing towards customer orientation, because the top management perceives radical change in the market. Some years ago it was a regulated market with a few products and nowadays it is deregulated with steadily increasing competition and fastening of innovation cycles. Therefore, the top management fully supports the customer-oriented initiative. Without analytics customer orientation would be hardly possible, because it is difficult to identify clusters of customers if the company has a large amount of customers. However, due to financial resource limitation and other company priorities, funding activities connected with analytics are often underbudgeted.

5.6.3 Competitive advantage

According to the Groningen’s customer performance index (Rijksuniversiteit Groningen et al., 2011), the company is lagging behind on extracting value for the firm in comparison with its direct competitors (≈10% lower than the industry average). Also the company is scored 7% lower than its direct competitors on delivering value to the customer. It can be explained by the fact that its direct Dutch competitor (according to financial reports of the company) also uses customer analytics. However, it was not possible to arrange an interview with this Dutch competitor to get to know to what extent analytics is used there. It should be mentioned here that the banking industry average is also higher than the telecom industry. In Table 5-14 can be found competitive advantage mechanisms in application to the case.

Competitive advantage	Case description
Bargaining power/ product	The company does not tailor its services based on analytics. Moreover, it is very difficult to do, because innovation cycles are very fast in the industry. In order to be able to generate an

features	insight, market information must be collected first and then it should be combined with existing data. However, due to fast innovation cycles, the company hardly copes with rebuilding models for new products and services that occupies most of the time.
Bargaining power/ switching costs	The company provides personalized service that has a positive impact on customer loyalty. Moreover, prediction of churn enables to be proactive and creates an action before a customer leaves. Thus, the customer gets attention at the right moment and it leads to improved retention.
Efficiency	Analytics has helped to reduce costs of marketing campaigns and sales to great extent. By indentifying (prospect) customers that are the most likely to respond to a sales or marketing campaign, the company was able to narrow its efforts to the more profitable activities: "We need to be able to identify the elderly group, because they will never migrate to a digital product; therefore, we need to take them out of the marketing, and otherwise, we are just wasting money spent for communication and that is where analytics is used".
Effectiveness	Analytics helps to effectively contribute to sales expansion activities by providing timely information on the opportunities within the customer base. Moreover, it increases customer retention in the markets, where it is relevant, and Dutch market is one of them. Predictive analytics helps to identify cross-sales opportunities and churn probabilities. This leads to better segmentation of the customers and it enables the possibility to act proactively on the most valuable segments for the company. So the usage of analytics helps to achieve company's customer objectives.

Table 5-14 Competitive advantage mechanisms

5.6.4 Discussions

According to a Dutch customer performance index (Rijksuniversiteit Groningen et al., 2011), the company underperforms on value to the company and value to the client in comparison with its competition. There is a lot of resistance to adopt analytics technology within the business units. The biggest barriers to adoption are low level of skills, quality of IT, quality of data and lack of financial resources. It is quite difficult for the company to innovate and deploy innovations to the desired extent due to these compatibility issues.

This case reveals that adaptability of employees is an outcome of decentralized structure and lack of financial resources, which are softened by suitable policies and practices. Moreover, relationship resources are also a direct outcome of the small size of the company, which leads to easiness in communicating, finding the right people and sharing information.

5.7 Automotive Retailer case study

The company is one of the biggest privately owned car dealers of manufacturer X in the Netherlands. X has a number of different personal car brands and commercial vehicles. The company's business is to sell cars to consumers and business customers. Moreover, it also provides after sales services such as maintenance, insurance, accessories, navigation systems, etc.

The company recently has decided to make a change from a product-based company towards more focus on customers. The need to focus on enhancing a client value and maximization of extracted value to the company has emerged. This change was caused by changes in the market place. The competition has increased and the past sales and marketing approach based on gut feelings is not appropriate anymore. Therefore, smarter decisions have to be made in order to survive. Moreover, the company treats analytics

as a capability that should be developed in-house. In addition, a customer relationship management department has been set up with the purpose to increase both: customer value and value for the company. In 2007 a centralized customer relationship department was created that was responsible for all brands' one-to-one marketing processes.

5.7.1 Customer analytics capability

Ability to gather information [Score: Moderate]

The ability to gather information is still to be improved to a great extent. One of the reasons is an under-developed IT infrastructure that leads to little data to be collected. Moreover, the company has just started using analytics a few years ago and it has still not enough expertise on what information to collect, including external information. However, a number of experienced people from the banking industry were hired that know how to combine different data sources. There are no best practices in the industry yet and the company is a pioneer in customer analytics among its competitors. Therefore, taking into account all said and the data from Table 5-15, it can be concluded that the company has a moderate ability to gather information.

Data source	Gathered	Used for analytics
Transactional data	Partly	+
Customer interaction	Partly	+
Descriptive customer information	Partly	+
Response to marketing stimuli	+	+
Market research	+	-
Data about the usage of a product	+	+
Environmental scanning	+	-
Suppliers data	+	+
Score	Moderate	

Table 5-15 Information assessment

Capability to extract knowledge from available information [Score: High]

The capability to extract knowledge from available information is very high because the company has enough in-house talent and a clear vision on what it wants to achieve. Moreover, the company has hired people from the banking industry to develop models. The banking industry has accumulated knowledge to be able to build sophisticated models.

Degree of customer analytics assimilation [Score: Low]

The company is able to adopt analytics technology very fast. As it can be seen from Table 5-16, it was able to deploy quite a lot functionality just over a couple of years. The goal is to approach customers in the right time with the right service or product. For example, based on predictive models, the company defines when tiers of a car are about to be worn out. It helps to approach the customer with an offer that is most likely to be accepted. The process of analytical development is quite stable and a routine. The deep evaluation of models work is conducted on a scheduled basis each half year, while brief monitoring is happening each month to be able to react faster if some unexpected changes happened or the model

simply does not work. The evaluation process is documented and distributed as a part of a campaign planning.

Area	Coverage	Description
Pricing	-	
Product development	-	
Channel management	-	
Selling	A bit of cross-sales. No up-sales	The company does ongoing outbound campaigns triggered by predicted events to sell extra products. No up-sales are done due to internal organization issues. As well no inbound sales are based on analytics.
Market planning	Segmentation and targeting of campaigns	Analytics is used to find new segments that are not served well by the company.
Marketing implementation	Campaign's performance evaluation	Analytics helps to extract information on campaign performance. There are a lot of campaigns going on at the same time and also some other company's related changes; therefore, without analytics it is very difficult to see which campaign was a success.
Strategic planning	Market prediction	The company conducts prediction with analytics of the total market in coming 5 years. The information is used in planning processes with original equipment manufacturers and it is also used to manage budgets for the coming years.

Table 5-16 Analytical marketing capabilities

5.7.2 Compatibility

Environment [Compatibility: High]

The Dutch market gives the company a possibility to apply analytics in all three directions: customer acquisition, customer expansion of wallet share and customer retention. There are a lot of opportunities for the company in the marketplace to use customer analytics. For example, each 3-4 years the customers have to make decisions on car purchases. Therefore, there are a lot of opportunities for customer acquisitions. Moreover, customer retention is highly relevant for after sales activities, because a lot of after sales services are renewable on yearly basis and it is very important that a customer will not switch to another service provider. In addition, the company provides a wide variety of complementary services related to the product that are a necessity rather than a luxury (such as insurance), so that there is a lot of opportunities for cross-sales. Therefore, the industry's environment provides a solid basis for extensive analytics usage.

Human resource

Adaptability of employees [Compatibility: Moderate]

A lot of decision-making power still resides within the brands and that leaves room for a lot of discussions. According to the interviewee, there has been a lot of time spent on arguing on what to do with analytics. It is a desire of the company to change that, but without a major restructuring it is difficult to do because now the different brands have too much decision power and conflicting interests. Moreover, the marketing department also resists change, because of a lack of skills and a difficulty to give up old habits.

Skills [Compatibility: Moderate]

The company has 4 persons responsible for analytics development on operational level and 2-3 persons that are responsible for more strategic level of analytics (marketing prediction). According to analytical consultants, it is more than enough, considering the size of the company. Moreover, it was a challenge to find analysts and most of them came from more mature industries such as telecom and banking. The company has invested in the education of employees to decrease resistance to change.

The marketing capability is not developed very well yet. Just a few years ago the company has started to learn how to deal with one-to-one relationships with a customer. In the past all campaigns were done on bulk basis. According to the interviewee, the marketing department is more willing to do big TV commercials rather than to conduct data driven one-to-one marketing. Therefore, the marketing capability still needs to be improved. So for now it is very difficult to reap benefits from analytics because analytics is all about one-to-one marketing.

Relationships [Compatibility: Moderate]

There is a lot of resistance to share information between brands. Incentives make it not profitable to upgrade a customer to another brand. Therefore, brand managers resist sharing information on customers.

The customer intelligence department tends to work more smoothly with the sales department than with marketing communications, because analytics switches towards a more sales-driven mode, which contradicts sometimes with branding. So the marketing communication department resists the adoption of analytics.

Cognitive style [Compatibility: High]

In the past the company has done segmentation of customers based on intuition, but now it is moving towards fact-based segmentation and decision-making. The management has struggled for more than a year to switch people from intuitive and experience-based marketing towards more data driven. Now, however, after a lot of convincing and showing positive results, people tend to rely on data.

Physical resources

IT infrastructure [Compatibility: Moderate]

The company had a little number of software systems before the management decided to start the customer relationship initiative enhanced by analytics. Therefore IT infrastructure is developed almost from scratch. That helps to prepare requirements with analytics and customer orientation in mind. The customer intelligence department works closely together with the CRM and IT departments to define requirements for new systems. However, the development process goes slow because there are a lot of functional requirements to be developed. So the IT infrastructure fits well to customer orientation enabled by analytics, but the functionality still has to be extended to a greater extent.

Data quality [Compatibility: Moderate]

There is little problem with the quality of existing data due to the integrated IT infrastructure. However, the data is incomplete because a lot of software systems are still yet to be developed. Moreover, the company purchases external data (e.g. demographics and lifestyle) to be able to target its acquisition efforts. Also data on car owners, collected by the government before 2007, exists that is accessible to all automotive companies. This data is a very valuable source of knowledge about consumer preferences (class of a car and type of a car) and which is used to a great extent for targeting acquisition efforts.

Financial resources [Compatibility: High]

The company is involved into a very profitable business of luxury goods. Therefore profits are higher than in businesses with commodity products and services. Moreover, the company has the biggest scale of operations in the Netherlands among its competitors. Therefore, financial resources are freely available to invest in analytics. The availability of financial resources was also supported by the interviewee.

Policies and practices [Compatibility: Moderate]

The company is divided into business lines that represent separate brands. The incentive schemes of these business lines do not encourage the sharing of information about a customer. This prevents spotting up sale opportunities because there is a conflict of interests between the central organization and a brand.

Structure and processes [Compatibility: Moderate]

The company is going through a major restructure that aims at centralizing customer relationship and analytics functions. At the beginning, the marketing intelligence department was a sub-division of the board of directors, but since a short time it is a part of the customer relationship department. According to the interviewee, it became easier to cooperate and share information between marketing, intelligence and customer relationship departments. This might be due to the physical proximity and also the alignment of strategic goals, because all three functions have one management team.

The marketing intelligence department consists of a market research team, a database analysis team, a data management team and a market business reporting and scenario planning department. The database analysis team is responsible for customer analytics on operational and tactical level, while the market business reporting and scenario planning department – on strategic level. The data management department is responsible for the maintenance of a marketing database.

Even though there was some restructuring done, the company is still organized around brands. That makes people more resistant to share information and customers. The intelligence department is still trying to change the structure, because, for example, up sales are more profitable from the company's point of view, but not profitable for a concrete brand. It is also part of an incentive scheme misalignment because it could be made beneficial for brands to upgrade a customer.

The company is already looking to reorganize business processes and structures around customer segments. Of course, the organization around brands would stay because it is profitable to have someone responsible for brands and segments.

Corporate culture [Compatibility: Moderate]

The culture of the company is very sales driven; therefore, any technology introduction that helps to improve sales is very welcome. The company’s sales driven culture acts as a complement to switching towards more customer orientation, because, according to the company’s financial indicators, there are more sales achieved when being more customer oriented. The only challenge is to develop a teamwork (clan) culture to share information between departments. The cultural change is also supported by the top management. According to the interviewee, the change is happening at a medium speed.

Strategy and top management commitment [Compatibility: High]

The company strategy supports customer orientation and data driven marketing to a great extent. Before conducting any analytical activities, the company decided to change its strategy, after this change analytics was adopted. Therefore, the strategy is fully compatible with analytical customer orientation. In addition, the top management fully supports data driven decision-making and customer orientation. That makes it possible to integrate analytics into the organization easier.

5.7.3 Competitive advantage

There are a lot of benefits achieved with analytics so far. It has helped to decrease the costs of marketing campaigns, to enable long-term planning activities with original equipment manufacturer, to improve customer satisfaction, etc. Moreover, Markus (2004) suggests that managers use IT to drive organizational change, because major cross-functional changes without IT focus does not work in many organizational cultures. Therefore, it might be that without focus on analytics, it would not be possible to re-design business processes.

Unfortunately, this company has not participated in the Groningen customer performance research (Rijksuniversiteit Groningen et al., 2011). The company is able to sustain competitive advantage, because of its scale of operations in the Netherlands. According to the interviewee, there are two more competitors doing something with analytics; however, they do not have the scale to make big investments in such technology, marketing database and CRM. In Table 5-17 the competitive advantage mechanisms can be found that apply to this case.

Competitive advantage	Case description
Bargaining power/ product features	Analytics is not used for product and service development.
Bargaining power/ switching costs	Car owners do not experience a lock-in to buy after sales services from a company that sold a car. There are a lot of universal services on the market that are not attached to a specific brand. However, by trying to approach a customer at a right moment, the company drastically

	increases chances that a customer would purchase its products and services, because it minimizes the customer's searching costs.
Efficiency	Tailored marketing campaigns help to reduce costs dramatically. The campaigns' response rate has improved from 1.5% to 10% after the introduction of analytics. This helps to minimize costs spent per acquired customer. Also outbound sales force is able to spend their working time more effectively, which reduces costs and time associated with their work.
Effectiveness	Analytics helps to expand sales activities of the company. According to the company's financial calculations, it is possible to sell approximately 1000 extra cars (~3%) with analytics. Moreover, it helps to extract value to the company from the customer oriented strategy, by concentrating only on valuable customers.

Table 5-17 Competitive advantage mechanisms

5.7.4 Discussions

The company is able to make bold changes due to financial resource availability and top management commitment. The company believes that analytical customer orientation is the only way to survive on the marketplace. There are three major barriers to the adoption of analytics: organization of business processes around brands, lack of collected data and incentive schemes that suppress knowledge sharing. It is worth mentioning that the company uses a techno-change situation to re-design its business processes. The advantage from analytics is sustainable due to a huge scale of operations in comparison with its direct competitors. Due to a 'big bang' approach to customer analytics deployment, the company has a lot of resistance to change. It is caused not only by a decentralized decision-making power, but also by a lack of skills and by the unwillingness to give up old habits. Moreover, relationships resource is also negatively impacted by existing policies, which are a consequence of the decentralized structure.

5.8 Cross case analysis and discussions

5.8.1 Competitive advantage mechanisms

As was expected, analytics is able to contribute to competitive advantage across three dimensions: effectiveness, efficiency and increase of bargaining power over its customers. However, the extent of achievement of competitive advantage varies due to a different degree of customer analytics adoption.

Bargaining power

The contribution of analytics to increase bargaining power varied the most between cases. As was mentioned in the literature section, there are two possibilities to increase bargaining power with analytics: to tailor products to the needs of the clients and to increase switching costs. Switching costs are of the same nature and in all cases they included relationship costs, search-related costs (cross-sales) and perceived economic risk cost, while tailoring products are the most difficult to achieve. Only Automotive Retailer and Bank A were using analytics to tailor products. Automotive Retailer is able to provide a lot of extra services such as insurance, maintenance and is not restricted to do it. Telco has only 3 basic services that are commodities and the improvement of these services is restricted to technology innovations. Therefore, the type of product plays a crucial role. The difference between banks lays in their environmental context. Bank B and C were affected by the crisis; therefore, the decision was deliberately

taken to simplify services and thus avoiding tailored ones. Tailoring financial services increases the risks for the company. Thus, complementarities influence the degree of the adoption of analytics to tailor products and services.

Effectiveness

Analytics provides the possibility to provide a personal treatment to customers and differentiate them. Thus, the company achieves the most benefits from analytics if it uses analytics to boost value to a customer and to maximize the extracted value from these relationships. However, it might be that the strategy of a company is only aimed at an increase of customer value or at the maximization of extracted value from transactions with the client. This leads to only a partially usage of analytics; therefore, less effectiveness is achieved. For example, in the case of Bank C, the company's strategy consists of a number of conflicting goals; therefore, the contribution of analytics to strategic objectives is rather dubious. This company's highest priority is to cut costs, which is conflicting with the goal to become customer oriented, because it requires a lot of investments. No matter how a tradeoff is made between these two conflicting goals, it will have a negative impact on the effectiveness.

In addition, all banking cases include future value of the customer in their decision-making process. This value is calculated based on costs and potential sales to a client predicted by analytics. This helps to make decisions that are profitable in a long-run. For example, Bank C tries to predict which teenagers will go to a university based on their parents' information together with other demographics, because educated people are more likely to find a high paid job. This information helps to identify teenage customers that are valuable in a long-run. Therefore, if the company is able to gather information, extract knowledge from it and apply it properly, then it is able to boost the effectiveness of its customer-related processes.

Efficiency

Analytics helps to decrease costs on marketing. For example, it is achieved by tailoring marketing campaigns based on the probability to react on a campaign or by the ability to monitor a campaign performance to decide timely if it makes sense to continue the campaign. Also it helps to redistribute the organizational resources more efficiently, taking into account the value of a customer to the company. In all cases a considerable cut in costs was achieved due to more efficient marketing and sales processes. Moreover, Automotive Retailer has used analytics adoption as an opportunity to re-design its business processes to make them more efficient.

5.8.2 Compatibility and analytics

The potential of analytics usage for boosting marketing capabilities are pre-defined to a certain extent. However, the companies differ in compatibility levels and, depending on what kind of resources are incompatible, in the ability to increase compatibility. Each case has its unique problems and issues and the amount of changes required by analytics to be deployed successfully varied per company. For example,

Telco has done minimal integration effort, like not making the IT systems compatible. In the same time, Automotive Retailer has decided to build an infrastructure from scratch according to requirements from the customer intelligence department.

There are a number of complementary resources identified during the case study research across a number of dimensions: human resource, physical resource, policies and practices, structure and processes, strategy and top management commitment and financial resources. The adaptability of employees was removed from consideration, because as an analysis has shown across the cases, low adaptability was a consequence of misfit between customer analytics and other complementary resources that were already included in the study. Therefore, this resource is excluded from the analysis. Moreover, policies and practices are a result of management and impacted by other resources such as size and a degree of centralization. Also relationships tend to be a result of size, culture, structure or/and policies and practices. Therefore, relationships resources and policies and practices resources are also excluded from the analysis.

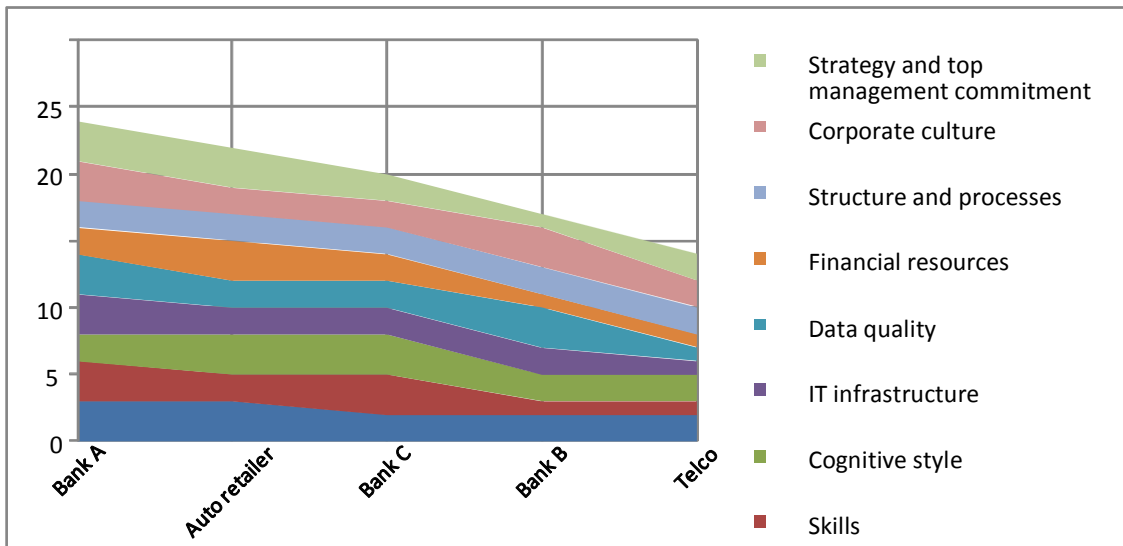


Figure 5-2 Comparative compatibility of the cases with analytics

Figure 5-2 demonstrates the realized compatibility within the cases. Bank A is the most compatible with analytics, while Telco is the least compatible. Bank A's major disadvantage is its decentralized structure leading to a major delay for deployment of changes and it increases resistance to change. Each time the bank needs to make a major change, it has to go through the whole cycle of convincing the business lines to use analytics. However, this resistance decreases with time, as more relationship assets are accumulated between the analytics department and the departments that are using analytical insights. Moreover, such decentralization also leads to competition for customers and the company needs to come up with different policies and practices to make lines to collaborate with each other. In terms of the structure, Bank C also suffers from a highly centralized structure in combinations with its big size. It leads to very slow market responsiveness. It takes 4 months for the company to implement a decision, which is very long in comparison with the other cases. However, the negative effect on knowledge sharing is compensated by

policies and practices that promote information sharing between business units by providing clear points of contact for each working group.

Bank C is almost as compatible as Bank A and it has a good chance to outperform Bank A due to its bigger scale of operations and more finance invested in analytics. However, debt to the Dutch government and negative image lead to a rather defensive strategy. And until the company hasn't overcome this, it would be falling behind Bank A on the adoption of customer analytics. Bank B is the least compatible with analytics among the banks as it is just started its journey to deploy customer analytics and the integration effort for it has yet been made. In case the bank does not improve compatibility it will have little chance to outperform Bank C and Bank A analytically. Moreover, Automotive Retailer has deliberately decided to make major investments in increase of compatibility before major analytical efforts take place, which resulted in a high realized compatibility. As it can be seen from Figure 5-2, it has achieved its objectives. Moreover, Telco is the least compatible and it has done little effort to decrease incompatibility. This incompatibility results in the situation that the company has to do a lot of efforts each time it deploys major changes.

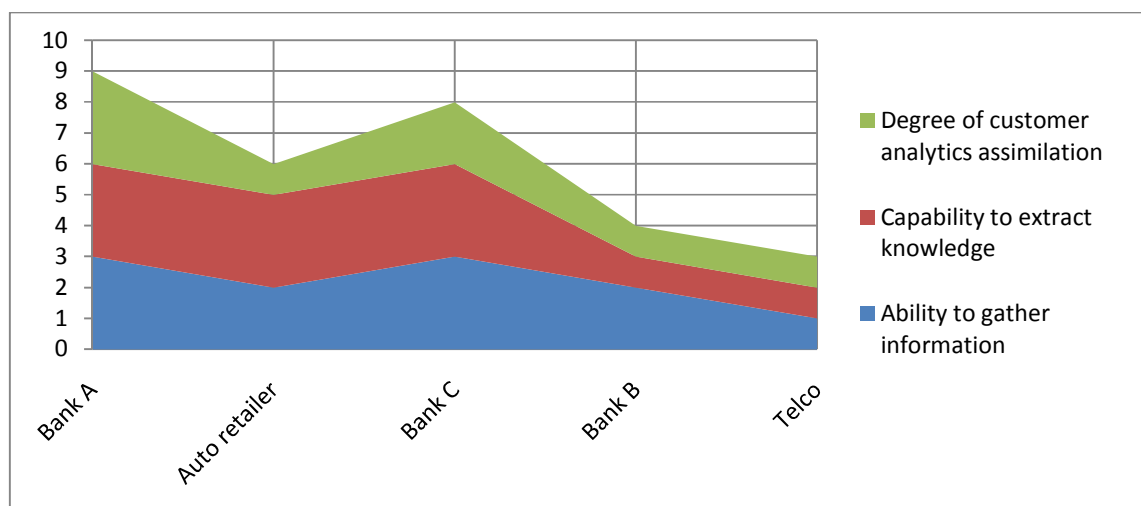


Figure 5-3 Analytics capability

It can be seen from Figure 5-2 and Figure 5-3 that the more compatible cases have a higher degree of analytical capability. Automotive Retailer is an exception because it has chosen a big bang approach to deliberately decrease incompatibility before conducting major analytical activities. Time is required to accumulate knowledge and other assets to increase analytics assimilation. Therefore, compatibility is high, but it takes time to develop analytical capability. Though, the incompatibilities and reasons of it differ per case that supports the notion of RBV that resources are heterogeneously distributed. Taking this into account, it can be stated that Hypothesis 2 can be supported.

Moreover, the time element also plays a crucial role in the adoption of analytics. For example, Bank A was very incompatible with customer analytics, but it took a lot of effort to improve this compatibility or decrease incompatibility by applying policies and practices. Moreover, all companies except the Telco have

redeveloped their IT infrastructure and integrated data into one repository to make it more compatible with analytics.

On the basis of cases' analysis, the major barriers to adoption can be identified: minimum scale of operations, availability of IT infrastructure to collect data and to distribute analytical outputs and management commitment. However, in order to be a leader in analytics assimilation, companies also have to decrease these incompatibilities: lack of one-to-one marketing skills; lack of analytical skills; poor knowledge sharing; difficulty to get used to a data driven way of working; inflexible and incompatible IT infrastructure; bad quality of data; lack of financial resources; conflicting incentive schemes; conflicting interests between departments enhanced by autonomous decision-making rights; inability to track client lifecycle; lack of top management commitment; conflicting goals in company's strategy.

5.8.3 Sustainability of advantage

IT project barrier

Analytics is the technology that requires a lot of organizational learning. Moreover, analytics requires an incremental approach to at least accumulate knowledge and necessary data repositories. There are comparatively little initial costs involved and also little risk taking is required to make the first steps. However, the more analytics assimilates into business processes, the more organizational resources are required, because more departments get involved into customer analytics. Therefore, there are more risks involved associated with incompatibility. Each maturity step adds more and more complexity and it is more costly and difficult to make a new step. Moreover, if the company did not fix incompatibility issues right from the beginning, these issues will be even more difficult to cope with on a new stage. For example, Telco is going to deploy a recommendation system for cross-sales and due to the incompatibility the IT systems it requires a lot of time to deploy it across different systems. The problem was already known for some time and adding new functionality based on workarounds would mean even more areas to fix in the future. So each stage of maturity requires more and more effort to deploy; therefore, the total project barrier in the long run depends on the integration effort made during the first steps of adoption.

Preemption barriers

Even though it is possible to patent models, none of the companies have a unique predictive model that is worth to patent it. Moreover, the interviewed companies have indicated that most of the models lose its predictive power within one year; therefore, waiting for a patent is not attractive. The other reason for not building a preemption barrier is that a bundle of resources involved in customer analytics is almost invisible. There are too many resources involved and the solution itself is too complex to be able to understand all the interactions.

Complementary resources barrier

Analytics is complemented by a big number of resources that are hard to imitate. It involves a lot of active human cross-functional interaction and skill (analytical and marketing). It requires management skills to manage complex interaction between complementary resources. It is complemented by information repositories and IT infrastructure that are heterogeneously distributed across companies (Wade and Hulland, 2004). Analytics also requires the clan culture element, which is also an intangible resource that is difficult to copy (Hall, 1993). All case studies show, that there are a lot of organizational resources involved in analytical capability building and usage. Taking into account that compatibility varies across cases, it can be concluded that the whole system of analytics-driven customer orientation is difficult to imitate.

One of the complementary resources of analytical capability development is scale of operations. For example in case of Automotive Retailer, it acts as a barrier to adoption. The company is the only one among its competitors in the Netherlands that is able to make big investments in analytics and customer relationship approach. However, in case of the banks, scale is an entry barrier for the industry; therefore, if the company was able to enter the business it would have a scale already. The same applies for telecom companies. Historically, the telecom industry was regulated with a little competition (2 in the Netherlands), which naturally have grown into oligopolistic competition. Therefore, all competitors have already a scale that allows investments in analytics and advanced marketing.

5.9 Summary

In this section case studies were discussed and analyzed. The banking cases have provided a basis to support Hypothesis 1. Telco and Automotive Retailer were not taken into account, because the data on analytics use within their competition is not available. Based on analysis of all cases, Hypothesis 2 was also supported. In the next chapter the relationship between competitive advantage and a degree of customer analytics assimilation is tested statistically.

Chapter 6. QUANTITATIVE ANALYSIS

In this section Hypothesis 1 is tested based on survey data on customer analytics practices within companies. Moreover, an existing assumption about a necessity to make a tradeoff between data-driven decision-making and intuition- and experienced-based decision-making is also tested statistically.

The data was collected in March 2011 by a research company Coleman Parkes on behalf of Accenture. Accenture has developed a number of questions to be answered by senior managers that are responsible for customer analytics in the selected companies. The target group was large organizations (over 1000 employees) in a number of countries (see Appendix 2). The research company used a computer-assisted telephone interview method. The data was divided into four groups: Financial services; Public services; Products; Resources.

6.1 Operationalization of concepts

6.1.1 *Competitive advantage*

Competitive advantage achievement induced by the use of analytics was not measured directly in the survey. However, there were three proxies measured: customer retention, time to market improvement and sales growth improvement.

Customer retention

Retention reflects an outcome of bargaining power over customers. The more a company can retain its customers, the more relationship switching costs arise. Moreover, more information is being exchanged; therefore, the perception of economic risk associated with the switch to another supplier also grows. This item was measured directly (see Q1804 in Appendix 3) on ratio scale.

Time to market

A benefit of analytics to contribute to tangible improvement of time to market of products or services was measured on a dichotomous scale (see question Q1706 in Appendix 3).

Sales effectiveness improvement

Sales performance improvement was measured on a 5 point Likert scale across three dimensions: growth through retention, growth through expansion of existing customer relationships and growth through acquisition (see question Q1902, Q1901, Q1903 respectively in Appendix 3). Principal axis factoring analysis was performed to see if these variables are interrelated (see Table 6-1). The reliability and consistency is acceptable for all groups.

Factor	Financial Services	Public services	Products	Resources
Through expansion of existing customers	.841	.867	.894	.906
Through retention	.763	.646	.706	.725
Through acquisition	.459	.483	.502	.52
Reliability and consistency				
Cronbach's alpha	.713	.689	.733	.747
KMO	.622	.622	.629	.634
% of variance	64.44	62.3	65.56	67.1

Table 6-1 Factor analysis for sales effectiveness improvement scale

6.1.2 Analytical capability

As was mentioned in the literature section, an analytical capability consists of three capabilities: an ability to collect information, an ability to extract knowledge from information and a degree of analytics assimilation.

Ability to gather information

This capability was not measured directly; however, an outcome could be measured by looking at the data quality. Following Turban's (2007) dimensions of data quality, such measures are extracted from the survey: completeness, accuracy, accessibility and ease of use. Completeness corresponds to contextual data quality, accuracy corresponds to intrinsic data quality and ease of use corresponds to representation dimension. Factor analysis is used to compose a single data quality score (see Table 6-2). The reliability and consistency is acceptable for all groups, except Public services. Therefore, the results should be treated with caution for this group.

Factor	Financial Services	Public services	Products	Resources
Accuracy	.709	.578	.719	.718
Completeness	.584	.704	.605	.639
Ease of use	.726	.347	.63	.731
Accessibility	.453	.286	.596	.672
Reliability and consistency				
Cronbach's alpha	.708	.531	.731	.782
KMO	.707	.612	.743	.730
% of variance	53.67	42.22	55.48	60.71

Table 6-2 Factor analysis for data quality scale

Ability to extract information

This item was not measured in the survey and no proxies were found to represent it.

Degree of analytics assimilation in customer-facing activities

There are three proxy variables in the survey that represent the degree of analytics assimilation: process maturity, analytical operational capability and frequency of use.

Analytics process maturity

Maturity was measured on a 6 point scale, where 1 to 5 were measuring perceptions of maturity of analytical capability from limited to enterprise-wide. The choice "6" referred to "do not know" (see

question Q12 in Appendix 3). The item was re-coded to replace “6” with a missing value in order to avoid statistics’ bias.

Analytical operational capability

Analytics provides insights about data patterns and maybe used by people in a decision making process or as a part of an automated rule engine for ongoing marketing campaigns. In the survey the question was asked if customer analytics is seen as an important asset for sales and marketing function from which new ideas and opportunities are regularly generated (see question Q05 in Appendix 3). The item was measured in a decreasing scale (1 to great extent to 4 not at all) so for interpretation convenience it was re-coded to an increasing scale (reverse).

Frequency of use

Frequency of analytics use was measured across three functions: sales, marketing and customer service (see questions Q0701, Q0702 and Q0703 respectively in Appendix 3).

Principal axis factoring analysis was performed to see if these variables are interrelated (see Table 6-3). The reliability and consistency is acceptable for all groups.

Factor	Financial Services	Public services	Products	Resources
Sales	.853	.502	.777	.802
Marketing	.725	.741	.755	.667
Customer service	.59	.535	.614	.685
Reliability and consistency				
Cronbach’s alpha	.762	.613	.755	.754
KMO	.667	.625	.681	.686
% of variance	67.9	56.48	67.36	67.64

Table 6-3 Factor analysis for frequency scale

6.1.3 Adoption trends

Adoption indicators

In the survey, the question was asked about analytics adoption factors across departments. A number of factors were suggested: nature of data available, data quality, volume of data, access to skilled analyst resources, internal departmental staff analytical skills, commitment to using analytics, analytical processes used, ability to act on insights and other. Figure 6-1 demonstrates frequency of positive answers per each category.

As it can be seen from the Figure 6-1, the most cited reasons are related to data. Nature of data available refers to the quality of accessible information, while quality refers to more cleanness of data. Moreover, volume of data is also important, because statistics is powerful only if there is some frequency observed. For example, if the company has hardly conducted any cross-sales activities in the past, then it has no available data to analyze and build predictive models.

The other important factor is that analytical skills differ per department. For example, customer service historically had a low retention rate; therefore, little skills reside in that department.

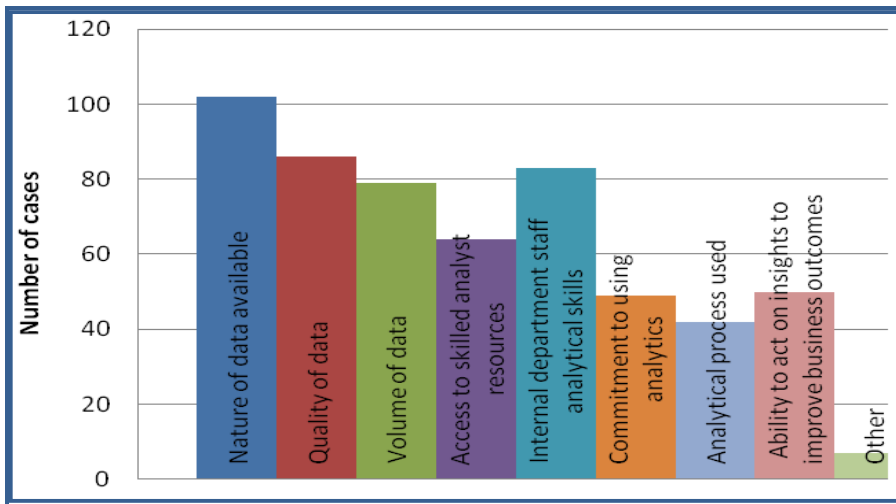


Figure 6-1 Adoption indicators

Adoption rate of analytics

As it can be seen from the Figure 6-2, the biggest users of customer analytics are sales, marketing, and customer service across all groups. This is similar to the situation in the conducted case studies.

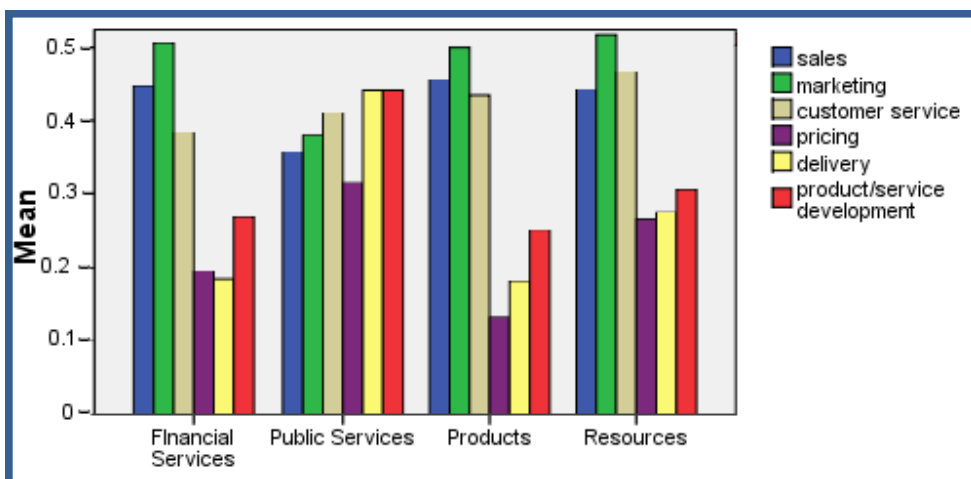


Figure 6-2 Analytics deployment per company type

Interestingly, public services adopt analytics for delivery and product development much more than the other three groups. They also adopt sales, marketing and customer service analytics to a bit lesser extent than other groups. It could be due to the non commercial behavior of the public services.

6.2 Competitive advantage

In this sub-section, Hypothesis 1 is tested across three proxies: customer retention, improvement of time to market and improvement of sales growth.

6.2.1 Customer retention

Customer retention is measured on a ratio scale; therefore, a linear regression is used to test a relationship between dependent and independent variables (see Table 6-4).

	<u>Financial Services</u>	<u>Public services</u>	<u>Products</u>	<u>Resources</u>
Coef. (Std. Err)				
Process maturity	.678 (.934)	3.204* (1.626)	3.464*** (1.231)	4.669*** (1.569)
Analytical operational capability	-2.197* (1.279)	1.169 (2.541)	-1.169 (1.905)	-1.132 (1.923)
Frequency of use	2.239* (1.168)	2.660 (1.694)	.824 (1.621)	2.898 (1.854)
Data quality	-.973 (1.152)	-.339 (1.746)	4.255*** (1.575)	3.840** (1.769)
Ln(size)	.247 (.833)	-3.011 (2.899)	-2.242* (.1.328)	2.189 (1.564)
Model diagnostic				
Observations	183	77	215	119
F	1.30	1.37	4.07	3.23
R2	.0355	.0881	.0887	.1251
Significance	.265	.245	.0015***	.0091***
*,** and *** indicate Significance at 90%, 95% and 99% respectively				

Table 6-4 Customer retention model

Analytics maturity has a positive significant impact on customer retention improvement for all groups except financial services. However, the test shows that frequency of use has a positive significant at 90% relationship for only the financial service industry. That means that financial services that use analytics more often are more likely to improve their customer retention with analytics. For the other three groups, more usage of analytics does not lead to more customer retention; however, for these groups more mature analytics does lead to more customer retention.

There is no significant relationship between analytical operational capability and improvement of customer retention except for the financial services group. Surprisingly, it is not only significant at 90% for financial services, but it is also negative. It could be due to the fact that operational capability is concentrated on short-term goals, while retention is profitable only in the long-term. Therefore, these two goals might be conflicting with each other. Moreover, financial services were the most affected group by the crisis of 2009 and most of its companies might be aiming at cutting costs. This is also the case for the banking cases that are included in this study.

In addition, with 90% of significance it can be stated that companies that enjoy higher data quality in products and resources are more likely to improve more on customer retention than companies with lower data quality. This is not the case for public and financial services.

The other significant finding is that data quality has a positive and significant relationship with customer retention improvement for products and resources; however, it is insignificant for financial services and public services.

6.2.2 Time to market

Time to market is measured on a dichotomous scale; therefore, logistic regression is used to test a relationship between dependent and independent variables (see Table 6-5).

	<u>Financial Services</u>	<u>Public services</u>	<u>Products</u>	<u>Resources</u>
Coef. (Std. Err)				
Process maturity	-.052 (.158)	1.201*** (.414)	.121 (.163)	.057 (.233)
Analytical operational capability	.293 (.224)	-.057 (.425)	.386 (.251)	.079 (.293)
Frequency of use	-.043 (.196)	.007 (.311)	.061 (.200)	-.162 (.273)
Data quality	-.419** (.196)	-.028 (.309)	-1.018*** (.214)	-.071 (.262)
Ln(size)	.119 (.134)	.123 (.441)	-.145 (.178)	.299 (.203)
Model diagnostic				
Observations	183	77	215	119
Log Likelihood	-79.655	-28.717	-77.721	-43.847
LR chi2	7.19	18.50	32.28	2.46
Pseudo R2	.0432	.2437	.172	.0273
Significance	.21	.0024***	.000***	.78
*, ** and *** indicate Significance at 90%, 95% and 99% respectively				

Table 6-5 Time to market model

Maturity has an insignificant correlation with time to market improvement, except for public services. This could be due to differences in adoption of customer analytics and also due to the difference of time to market interpretation. As it was mentioned above, public services adopt customer analytics more often in such areas as product development and delivery than other groups. In nonprofit companies time to market relates to any service they deliver, while profit-making companies associate it mostly with products and not with extra services, such as information on the website. During the case study part of the research, it was also revealed that companies associate time to market mostly to products that bring profits or are strategic in nature.

Analytical operational capability has an insignificant relationship in all groups. It might be due to the fact that in a lot of companies different people have responsibility for marketing/sales and product development. Taking into account that marketing/sales senior managers were interviewed in this survey, they could mostly answer this question only about their own department. For all groups the relationship between time to market and frequency of use is insignificant. The same applies to the size.

Data quality has a negative relationship with time to market improvement, which is significant only for financial services (at 90%) and products (at 99%) groups. So it can be stated that financial services and products companies, which enjoy higher quality of data, are less likely to improve time to market than companies with lower data quality. It might be due to the perceived nature of data quality variable. Adopting more extensive usages of analytics, companies bump into more problems with data quality,

because more data from different sources is used. This is why more precise measure should be adopted for in future research.

6.2.3 Sales effectiveness improvement

Sales effectiveness improvement is measured on an ordinal scale; therefore, logistic regression is used to test a relationship between dependent and independent variables (see Table 6-6).

	<u>Financial Services</u>	<u>Public services</u>	<u>Products</u>	<u>Resources</u>
Coef. (Std. Err)				
Process maturity	-.303*** (.104)	-.748*** (.181)	-.229*** (.086)	-.282** (.133)
Analytical operational capability	.413*** (.139)	-.448 (.275)	-.235* (.138)	.035 (.159)
Frequency of use	.346*** (.126)	.631*** (.196)	.387*** (.121)	.221 (.159)
Data quality	.550*** (.131)	.631*** (.196)	.236** (.113)	.283* (.158)
Ln(size)	.149* (.086)	.214 (.172)	.035 (.093)	.218 (.126)
Model diagnostic				
Observations	183	77	215	119
Log Likelihood	-618.802	-215.131	676.218	-381.375
LR chi2	48.98	37.38	30.56	17.14
Pseudo R2	.0381	.0799	.0221	.022
Significance	.000***	.000***	.000***	.0042***
*, ** and *** indicate Significance at 90%, 95% and 99% respectively				

Table 6-6 Sales effectiveness improvement model

The relationship between process maturity and sales effectiveness improvement is significant at over 99% for all groups, but surprisingly negative. There might be a number of reasons that could explain this result. It might be due to the fact that sales effectiveness improvement is measured based on perception. First of all, the law of diminishing returns states that adding more of one factor of production (analytics) will at some point yield lower per-unit returns (Samuelson and Nordhaus, 2004). Thus, taking into account that sales effectiveness improvement is a perceived variable, it might mean that an extra maturity improvement leads to less and less added value to sales effectiveness improvement. Secondly, it might mean that the focus of analytics deployment change over time. Therefore, the more a company learns using it, the more other applications emerge.

For all groups, except resources, the relationship between sales improvement and frequency of analytics use is positive and significant at 99%. Moreover, frequency of use also reflects the degree of dependence of decision-making on analytics and facts.

The quality of data has a positive relationship with sales effectiveness improvement at 99% of significance. Therefore the null hypothesis, saying that there is no relationship between these two

variables, can be rejected. So it can be stated that companies, which perceive higher quality of data, are more likely to enjoy sales growth improvement.

6.2.4 Discussions

From the regression tests, it could be seen that the significant of relationships often differs per group. The results could be generalized only to these groups and not to other industries. Customer retention does improve with more analytics for Public services, Products and Resources significantly (at least 90%). Time to market has no significant relationship with maturity and frequency of use, except for public services. This could be explained by difference in adoption of analytics in different industries. Sales effectiveness improvements diminish with maturity of analytics within an organization. Decrease of perceived sales expansion might refer to the fact that there is the limit of the market and company's ability to grow at some point. More direct measure of analytics assimilation should be adopted in the future research.

In addition, data quality that represents a measure of an ability to gather information has a positive significant relationship with sales effectiveness improvement for all groups and with customer retention improvement from Products and Resources. However, in case of time to market, this relationship is negative and significant for Financial Services and Products. Due to the fact that there is not a significant relationship between other variables and time to market for these groups, this relationship might be due to factors that are not included in the study.

It is worth mentioning that Pseudo R2 and R2 are quite small, meaning that models have a low goodness of fit. One explanation to it could be a relatively small sample size. The other reason could be a relatively small homogeneity of the groups. Yet another reason is that the concepts were measured through proxies. Moreover, not all relevant variables are included in the model such as environmental conditions.

6.3 Soft driven decision making and hard data driven

It is believed that with increase of data driven decision making, the importance of experience and intuition decreases (Brynjolfsson et al., 2010). However, during the case studies it was found that human resource gains new knowledge from data and it reinforces creativity and intuition. Therefore, the current study would test the assumption of the research world that with an increase of data driven decision making the importance of intuition and experience decreases (soft driven decision making). In the survey questions were asked about the importance of intuition, experience and consultation with colleagues in decision making (see question Q0303, Q0304 and Q0305 in Appendix 3), and importance of simple data and more complex analysis (see questions Q0301 and Q0302 in Appendix 3). In order to test this relationship, a scale is composed for soft-driven decision making and it is used as dependent variable in ordinal logistic regression. Factor analysis is used to compose a scale for soft-driven decision making (see Table 6-7). The reliability of the scale is acceptable. In case of data-driven decision making, the reliability was low (Cronbach's $\alpha < 0.4$); therefore, no scale was composed.

Factor	Soft driven decision making
Intuition	.671
Experience	.613
Consultation with colleagues	.518
Reliability and consistency	
Cronbach's alpha	.626
KMO	.640
% of variance	57.31

Table 6-7 Soft driven decision making scale

The test result shows (see Table 6-8) that there is a strong positive significant relationship at 99% between soft-driven decision making and data driven decision making. This actually rejects the assumption of the research world that increase in data-driven decision-making leads to decrease in soft-driven decision-making at the 99% of significance.

<u>Combined</u>	
	<i>Coef. (Std. Err)</i>
Simple data and facts	.548*** (.70)
Complex data analysis	.462*** (.713)
Model diagnostic	
Observations	635
Log Likelihood	-2352.52
LR χ^2	154.34
Pseudo R2	.0318
Significance	.000***
*, ** and *** indicate Significance at 90%, 95% and 99% respectively	

Table 6-8 The relationship between soft and data driven decision making

6.4 Summary

In this section the relationship between analytics use and competitive advantage was tested statistically for public services, financial services, products and resources. Proxies were used to represent assimilation of analytics (process maturity, analytical operational capability and frequency of use) and an ability to gather information (perceived data quality). Competitive advantage was also represented by the proxies: customer retention, time to market and sales effectiveness improvement. Time to market did not show significant relationships with assimilation of analytics, except for public services. This could be due to a difference in adoption of customer analytics. Public services apply analytics for product delivery and development more often than other groups. Sales effectiveness improvement has a positive significant relationship with frequency of use for all groups. However, it has a negative relationship with maturity. It might mean that over time the perception of improvement achieved diminishes. Customer retention has a positive significant relationship with maturity, except for financial services. However, there is a significant relationship with frequency of use for financial services. Moreover, goodness of fit is also very low. This

could be due to the use of proxies to test relationships. The future research should adopt more direct measures of variables.

In addition, the results show that an increase of data driven decision making also increases the importance of decision making based on intuition and experience. This means that previous assumption of the research world (e.g. made in Brynjolfsson et al. (2010)) that data driven decision making leads to less soft driven decision making should be questioned.

In the next chapter major findings of this research is discussed and the main research question is answered.

Chapter 7. CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

The goal of this chapter is to answer the research' main questions, by answering the sub-questions introduced in Chapter 1. Also the limitations of the study are discussed. In the end, limitations are discussed with further recommendations for future research.

7.1 Conclusions

This paper investigated whether analytics is able to provide competitive advantage. Also this research looked into mechanisms of competitive advantage achievement with customer analytics. Moreover, the research looked into complementary resources that influence the extent to which this advantage is achieved.

Mechanisms of competitive advantage achievement

According to the literature, competitive advantage is achieved through three basic mechanisms: bargaining power of the company over its supplier/customer, effectiveness and efficiency. Due to a concentration of the current research on customer analytics, bargaining power over suppliers was not taken into consideration, but was kept in mind during the research.

The contribution of analytics to competitive advantage depends on areas of analytics assimilation. Due to the fact that customer analytics is a custom-made activity, each company is able to decide themselves what areas of analytics adoption are needed. All cases, which were included in the study, use analytics to enable one-to-one customer interaction with the company. However, it might be the case that customer analytics is used only for pricing that does not differentiate between customers, but rather analyzes customer data on aggregated level to optimize pricing. For example, a web-based hotel booking company analyzes historical data in order to be able to predict availability of hotels on a particular day and extract all predictors of price elasticity. This helps to maximize the profits of the company. In this case, no one-to-one marketing or sales is possible, because the company cannot identify a customer before purchase is made. These kinds of customer analytics usages were not included into this study due to availability of cases.

According to the literature, there are two possibilities for customer analytics to increase bargaining power over customer: to provide tailored products and to influence switching costs. Most of the cases have not used analytics for product development; therefore, no conclusions can be drawn from the case studies. Moreover, quantitative analysis shows that there is no significant correlation between time to market improvement and analytics maturity for financial services, product companies, and resource companies. This might be due to the necessity for analytics to have a historical record, which might not be the case for a lot of new products. Interestingly, time to market improvement is significantly correlated with analytics maturity for public services. This might be due to a difference in perception between public services and other organizations about what time to market relates to. The interviewees from the case companies were linking 'time to market' to their main profitable products, excluding small extra services such as receipts. However, there is no difference for not-for-profit organization among their services. Moreover, some public

organizations use analytics as an informational product. For example, the Open Knowledge Foundation has provided a service³ for UK citizens based on analytics. In addition, test results show that companies that are more frequent users of customer analytics are not more or less likely to improve time to market with analytics. Also companies that perceive analytics as an important asset from which ideas and opportunity are generated on operational level are not less or more likely to improve time to market than other companies. The other interesting finding is that financial services and products companies with higher perceived data quality are less likely to improve time to market than companies with lower perceived data quality. This is not the case for public services and resources companies. In these industries companies with higher perceived data quality are as likely to improve time to market as companies with lower perceived data quality.

In case of one-to-one marketing, analytics is able to help to improve relationships with customers. This increases relationship costs that are perceived by a client. All cases had an objective in their analytics adoption to become pro-active and more personal with their customers. This is enabled by the ability of analytics to predict certain outcomes (e.g. when a customer is likely to leave) or to identify differences between groups of customers. Moreover, in case of analytics use for cross-sales, a company is able to decrease search-related costs of its customers associated with its products. In this way the company increases the difference between search-related costs associated with the competitor's products and its own products. Furthermore, analytics helps to identify customers that provide no/little profit at the moment, but are valuable in the long run. This enables a possibility to invest in the relationship with such customers selectively. A customer learns about a company and that increases economic risk costs associated with another company. That in turn increases the chance that a customer would stay with the company when he/she starts being profitable. Existing switching costs, which are enhanced by analytics, can be projected to an increase of customer retention due to analytics. Statistical analysis shows that there is a positive significant relationship between analytics maturity and customer retention for product services, products companies, and resources companies. However, there is no significant relationship for financial services. That means that financial services with higher analytics maturity are not more likely to outperform their competitors with lower analytics maturity on customer retention. However, only financial services companies that use analytics more frequently are more likely to increase customer retention. Moreover, analytical operational capability has insignificant relationship with customer retention in public services, resources and product companies, except financial services. According to test results, financial service companies, which consider analytics as an important asset from which new ideas and opportunities are generated on an operational level, are less likely to increase customer retention with analytics. In addition, perceived quality of data has a positive significant relationship with customer retention for product companies and resource companies only. This means that only in these industries companies that have

³ <http://wheredoesmymoneygo.org>

better quality of data are more likely to improve customer retention with analytics. This is not the case for financial and public services. It might be that the difference lies in the fact that the latter two groups are service companies, while resources and products companies offer physical products. In service industries a quality of service implies also a quality of relationship assets; therefore, for financial services and public services it might be that the bigger differentiator in customer retention is relationship assets and not intellectual assets. From these results it can be concluded that there are differences in analytics benefits between industries; therefore, the results can be generalized only to industries that were included in the survey.

The contribution of analytics to increase efficiency is quite straight forward. It might help to decrease marketing costs by identifying the customers who are likely to respond to marketing campaigns. Also it might help to monitor the performance of campaigns, which is difficult to do without analytics due to the effects of other company activities. This monitoring helps to identify campaigns that do not perform well in time. Timely withdrawal of underperforming campaigns might save a lot of costs associated with these campaigns. The efficiency improvement was not represented in the survey, but all cases demonstrate a radical cut in marketing and sales costs. However, in all cases major efficiency improvements were achieved at the beginning of analytics adoption. Therefore, it can be concluded that analytics cannot provide competitive advantage through efficiency improvement, but it can put a company in competitive disadvantage in case its competitors have adopted analytics and the company has not.

Each company has a unique strategy so that the contribution of customer analytics to its effectiveness depends on goals of the company. In a lot of the cases effectiveness improvements are related to an increase of bargaining power over a customer. Furthermore, a company might also have conflicting strategic goals, in which case it is difficult to evaluate the contribution of analytics to achieve strategic goals, because any activity would lead to a tradeoff between these conflicting goals resulting into a nullified outcome. However, each company aims to increase sales. Sales effectiveness improvement by the deployment of analytics was represented in the survey. All groups represented in the survey revealed a positive significant relationship between perceived data quality and sales effectiveness improvement. It means that companies that perceive their data to have a better quality are more likely to have higher sales growth rates than companies with a lower perceived data quality. The same applies for frequency of use. The more frequent users the more likely the company benefits from sales effectiveness improvement. Surprisingly, the more mature companies are more likely to have less sales growth than less mature companies. Due to the fact that maturity is a path that all companies take, it might mean that with growing maturity companies perceive less sales effectiveness improvement, meaning that each maturity level result in less and less sales growth. This is in line with a theory about diminishing returns (Samuelson and Nordhaus, 2004), which states that adding more of one production factor (e.g. analytics maturity level) will at some point yield lower per-unit returns. In addition, in financial service companies, which have a perception of analytics to be an

important asset to generate ideas and opportunities, are more likely to improve sales growth, while in product companies the situation is completely opposite. Moreover, in public services and resources companies this perception does not matter at all.

All in all, it can be concluded that the results differ per industry group; therefore, the results cannot be generalized even across represented groups in a lot of cases.

Barriers to achieve competitive advantage with Customer Analytics

The main argument of the paper is that the company that owns the most compatible resources would be able to outperform competition with customer analytics if it starts the adoption of customer analytics timely. The time element is very important due to three reasons: an ability to increase compatibility, assets and knowledge accumulation effects. The case studies show that the companies differ in their degree of initial compatibility. This implies that the company that has started first is able to decrease incompatibility before others do it. However, some other company would be able to outperform that company if, at the moment of analytics adoption, it has similar or better compatibility. Asset accumulation effect takes place through an importance to gather historical information that is required to conduct analysis. In order to be able to do that, a company must not only have IT systems in place to collect such information, but also must have a historical record related to a certain business outcome. For example, one of the cases has hardly conducted any cross-sales; therefore, in order to be able to find predictors of a cross-sale opportunity, the company has to conduct more cross-sales without analytics first. Furthermore, customer analytics is a cross-functional activity; therefore, involved departments have to build a relationship in order to be able to share information and to take joint actions. In the literature this is called relationship asset accumulation effect.

It also appears that all cases go through a learning process on how analytics can be used for business needs. First of all, a company has to learn what business questions can be answered with analytics. Then this company has to learn what information it is possible to collect internally and what information it is possible to buy externally. Also it has to learn how to combine this information to get new or improved insights. It appears from the cases that not all analytical initiatives work as it is expected, which means that a company has to learn also what works and what not. This learning process leads to knowledge accumulation over time.

Minimum scale of operations, availability of IT infrastructure to collect data and to distribute analytical outputs, and management commitment are required to adopt analytics. In addition, these adoption problems were identified during the case studies: lack of one-to-one marketing skills; lack of analytical skills; poor knowledge sharing; difficulty to get used to a data driven way of working; inflexible and incompatible IT infrastructure; bad quality of data; lack of financial resources; conflicting incentive schemes; conflicting interests between departments enhanced by autonomous decision-making rights; inability to track client

lifecycle; lack of top management commitment; conflicting goals in company's strategy. These problems are a result of incompatibility between customer analytics and organizational resources.

Potential value of analytics

Analytics has a potential to contribute to a number of market-oriented capabilities: pricing, product development, channel management, selling, marketing planning and marketing implementation. Pricing analytics might be used to optimize pricing by predicting elasticity of demand and willingness to pay. Products of service development might profit from analytics incrementally by predicting which product features have the highest probability to meet customer's expectations. Channel management capability benefits from analytics by the possibility to identify which channel is most suitable to provide a concrete offer to a particular customer. Moreover, analytics helps to identify the most valuable customers and when they are the most likely to churn. This provides a time slot to act in order to retain the best customers. Sales benefits from the ability of analytics to predict which product or service a customer is most likely to buy. Analytics enables the ability to sell even through customer service, because less sales skills are required. Moreover, analytics helps to identify clusters of customers in the data and the potential needs they have. This helps to improve targeting of campaigns and segmentation of customers. In addition, due to different activities performed by a company, it is virtually impossible to monitor marketing campaign performance without the use of analytics. However, analytics helps to boost only intellectual assets of customer-facing capabilities. It should be complemented by a strong relationship asset.

During case studies it appeared that not all of the market-oriented capabilities might be relevant to a particular company. First of all, a company should look into the possibilities of a particular market. In some markets customer retention might not be an issue; therefore, in this case retention-related analytics would use resources that could be used elsewhere more effectively.

Reflections on developed model

On the basis of the literature review two hypotheses were formulated:

Hypothesis 1: *The greater the capability for customer analytics, the more competitive advantage can be achieved*

Hypothesis 2: *The lower the compatibility between customer analytics and complementary resources, the lower customer analytics capability*

Hypothesis 1 was tested by using two methods: case study method and quantitative analysis of the survey on analytics practices within the companies.

Case study analysis showed that companies with higher customer analytical capabilities had a higher score on providing value to a customer and extracting value from these relationships. Therefore, the conclusion is made that, on basis of the case studies, Hypothesis 1 can be supported for financial services. However, as it was mentioned above, the relationship between the three proxies of competitive advantage (customer retention, time to market and sales growth) and analytics is dubious and differs across

industries. Of course, these measures are not exhaustive; therefore, only based on the used measures it is difficult to support or reject Hypothesis 1.

Hypothesis 2 was tested only by case studies. The case studies have shown that the cases with the most advanced usage of analytics were also more compatible with analytics. However, it took time and efforts to gain such compatibility.

The other important finding is that the conceptual model should be adjusted to take into account also a decision on what to do with analytical insights and implementation of this decision. This decision depends not only on resources and capabilities that are associated with or involved in analytics, but also other resources that are available to utilize in order to act on analytical insights. For example, a company might identify a valuable customer that is likely to churn, but it has no necessary resources (e.g. finances) to perform an action to retain this customer.

In addition, an assumption of the research world (e.g. (Brynjolfsson et al., 2010)) that increase of data driven decision making leads to less usage of intuition and experience should be reviewed. The current research has found that these two types of decision making are positively correlated, which means that more use of data in decision making process reinforces more usage of intuition and experience.

On the basis of the answers to the sub-questions, the main research question can be answered:

Does Customer Analytics contribute to competitive advantage?

If yes, through what mechanisms?

If not, why not? What are the barriers to achieve competitive advantage with CA?

It can, but not necessarily. The contribution and its mechanisms depend on industry possibilities and the compatibility between customer analytics and complementary resources.

7.2 Limitations and recommendations for the future research

One of the important limitations of the current study is its concentration on only large enterprises due to practical reasons of accessibility. Also Wahlberg et al. (2009) points out that also a large enterprise bias exists in customer relationship management research. Therefore, more research should be conducted on applicability of conclusions for small and medium enterprises.

Also the relatively small size of the case study sample is a limitation. A small amount of interviews were conducted due to a low willingness to participate in the research. Therefore, future research would benefit from deeper case studies on this topic. Also only service organizations that were customers of Accenture were contacted successfully. The other potential bias might be hidden in the nature of relationship between surveyed companies and customers. All cases had some sort of ongoing interaction with their customers through long-term relationship elements such as subscriptions, maintenance contracts, and financial services. More studies should be conducted on a value of analytics in the context of short-term

nature of the relationship between a customer and a company. An example of such industry could be the airline industry.

An advantage of the survey sample is that it is quite unique and it is not that easy to get access to data that is collected from practical usage concerning a particular technology. However, the survey has a lot of limitations. First of all, the findings can be generalized only to the industry groups that were tested. Secondly, the sample size is relatively small and homogeneous. Therefore, the results should be treated with caution and ideally a future research should be conducted with a larger heterogeneous sample. Moreover, the measures of competitive advantage should be extended and also future research should test a relationship between customer analytics and aggregated level outcomes such as revenue growth, productivity growth, market share growth and profitability.

In addition, the literature review was also limited to articles that were accessible from TU Delft or Carnegie Mellon University subscriptions. Therefore, there is a chance that some important articles, which are not included in these subscriptions, could change the research direction and assumptions.

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APPENDIX 1. INTERVIEW GUIDE

Introduction

Thank you for inviting me. I am doing this research for the Master Management of Technology at the Technical University of Delft. The purpose of my research is to get more information on what resources and capabilities are required to deploy predictive analytics (PA), and also how does this technology contributes to competitive advantage.

Would you mind if I record our conversation?

This structure of this interview is as follows. I will first provide a definition of Predictive Analytics, then ask some general questions, and then will ask questions about PA in your company.

Definition of PA: the extensive use of data, statistical and quantitative analysis, exploratory and predictive models, and fact-based management to drive decisions and actions. As an example can be predicting the next best offer for the client, churn prediction score per customer, etc.

Section	Question	Remarks
General: Introduction	How long have you been working for this organization?	
	What is your function?	
	What is your relation to Predictive Analytics technology? [did he come before implementation?]	
	Could you tell me in brief about real-life PA projects you have gone through or busy with currently?	
General: Business objective	When did you for the first time deploy PA?	
	What was initial purpose to deploy the technology? Did it change over time? [if yes] Why?	
	What are the business areas of current usage of this technology? [Marketing: campaign management, upsell, cross sell]	
	How do you use PA? [it the scores distributed, or models are embedded in into software, are the business rules defined and automated?] [if scores.. typical - monthly basis] How often these scores are refreshed? Is a reason to refresh it with this frequency? What IT systems are involved? [CRM, Website...]	
General:Deployment	Was PA a successful project in terms of time, cost and quality?[if yes] Why do you think it was a success? [if not] Why not?	
	Could you please tell me the major historical events in deployment of PA in your organization? (iterative deployment or big bang)	
	What parties had a stake in PA project? Who was a project sponsor at each phase? What functionality was implemented at first? (cross-sell, up-sell, campaign management) Was it IT push or business pull?	
CA	What are the benefits that you have reaped from the system[strategic, tactical, operational]? Do you think you could use it better? [if yes] How?	

	Do you measure benefits? How?	
	Do you perceive that the system provides your company competitive advantage? Why and How? [check points of CA]	Define CA
	Could you sustain the advantage? [if not]Why? [if yes] How?	Define Sustainable
Technology characteristics	Is your solution customized or is it standard package from vendor? [if custom made] Why you choose for a custom-made solution? [If not] Why did you choose for a standard solution?	
	What were the decision criteria to choose this tool?	
	What sources of data types do you use? [structured vs unstructured; external vs internal] What is the percentage of external data that you use?	
Process around PA	What is your approach to model management? (ad-hoc: individuals manage their own models, projects: project teams manage the models, program: program office coordinates models creation across projects or center of excellence: established best practices and standards)	Appendix with CRISP
	Who is involved and what is the process of analysis-modeling-use-validation? Who are the main actors and what are their responsibilities? Do you use any standard methodology around it? (e.g. software development processes, version control) Are you familiar with the standard Cross Industry Standard Process for Data Mining (CRISP-DM)? Do you use it in your modeling process?	
Models	How long does it take for analyst to develop the model from scratch? [if more than 3 weeks] Why does it take so long?	
	What is the average lifespan of the model?	
	How many models do you have so far in your active use?	
New models	Do you modify your solution? [if not skip modification] How often?	
	Can you continuously innovate with the system? [yes] How? How often? [no] Why not? What are the restrictions to innovate? [check if legal issues covered]	
	Is it a formal process? Is it documented?	
	What is the rate of new models per year? Is it declining?	
Validation of models	Do you validate accuracy of models? How often? Why?	
General	How many employees department N has? How many people out of these use the modeling results? Are there any clusters of users [direct and indirect users]?	
User	Is the system easy to use in general? E.g. understand the output [if no] Why not?	
	Are you satisfied with accuracy of predictions?	
	To what extent do you depend on data to support your decision making ?	
	To what extent do you have data to make decisions? How could it be improved?	
Actionability	How easy is it to action on the predictions? [actionable]	

	Do modelers come up with models that are difficult to action on? [beer and diaper correlation example]	
	What does restrict the action ability of insights? Can it be improved? How?	
Response capabilities	To what extent can you respond if something happens with regard to your customer?	
	What kind of changes do you respond on? [choice of fundamental, important, change in needs]	LET OP: Functionality
	How fast do you implement your planned activities with regard to customers?	
	Could you improve it? How?	
Strategy	How did this technology fit organization strategy? Did it enable to invent new strategies? [if yes] What exactly?	
Business process	To what extent deployment of PA influenced sequence of work activities within department? Could you give examples?	
	To what extent PA fits tasks?	
Structure	What is the degree to which formal rules define roles, authority relations, communications, norms and sanctions, and procedures within your organization? Do you think that deployment of PA has impacted the level of formalization?	
	To what extent is Decision-making authority in your organization centralized? What is the extent of participation by organizational members in decision-making? Do you think that this decision-making authority changed because of data availability? How?	
	What is the degree of specialization in your organization? Do you rotate your employees to gain more broad skill set?	
Physical resources	In what IT resources did you have to invest in? In what complementary non-IT physical resources did you have to invest in?	Suggest: hardware for data warehouse; Software for campaign management and SPSS/SAS
	What pre-existing resources were important? [except data and transaction systems]	
Culture	Can you describe the culture in your organization? Does it differ per departments involved in PA?	Appendix with culture
	To what extent did you need to change the culture to deploy PA? What was the change?	
	How did you change the culture? Did external vendor (SAS or IBM) help you with it? How?	
Human resource	To what extent did you have to invest in human resource? What exactly? What pre-existing skills were important?	Suggest: analytic skills, technology-related skills
	Did your company had previous technical experience related to PA [both marketing department and IT; KNOWLEDGE RESOURCE]? [yes] Which one? [both] which one did you have to develop?	
Relationship resource	What was the past experience between the IT, vendor and marketing department? [if needed also statistical department if existed before] [check if above the question of top	

	management commitment was answered about project sponsor. If not - ask]
Practices and policies	How this technology impacted existing practices/policies in the company? [explicitly ask about incentive schemes]
	How did this technology impacted interdepartmental collaboration?
IT department	Which IS capabilities were the most important during deployment of PA and which 3 are important now?
	What was the project costs of PA deployment? How long?
	How big is your IT department? What is the IT budget? To whom they report?
	[Business-IT alignment] What is the extent to which IT staff understands the business needs? TO what extent applications in general cover business requirements?
IT infrastructure	What is the reach of IT systems across the value chain? To what extent is IT integrated?
	Are you satisfied with work of service for the PA? [if not] Why not?
	What is the percentage of unsatisfactory requests? [ask both managers of department and PA unit] Why does it happen?

Ending

Are there any questions that I did not ask and could be relevant to me?

First: For my research I would also like to get a view from a user and an IT person involved in Analytics. Would it be possible to get in touch with an IT person who has knowledge about deployment of this technology in your organization and also with the most advanced user? How could I locate and approach these people?

Do you have any questions? Would it be possible to approach you again? This is the end of our interview. Thank you very much for your time.

APPENDIX 2. INTRODUCTION EMAIL

Dear Sir/ Madame,

I am Olena Bazylevska, a graduate student from TU Delft doing my master thesis with Accenture. I am trying to investigate the practices of using predictive analytics for business purposes. As part of this thesis and research I am particularly interested to get into contact with companies that have been on this journey towards predictive analytics and are willing to share their experience.

I would like to find out a couple of things (amongst others):

- what capabilities companies need to build (e.g. data understanding, technical skills, innovative use of insights);
- what complementary changes to organization need to be applied (e.g. importance of new strategies, structural changes, incentive redesign, new practices);
- what knowledge, skills, IT infrastructure requirements needs to be met to be able to start using predictive insights.

In order to generate an insight on these topics, I am looking for a number of cases that already have built an experience with this technology for marketing. <company specific knowledge of situation>

It would be great if you could share your experience. It would be great if you could find some time in your agenda to meet and discuss the subject. And also would be great to meet actual users of the system to talk about the use and the benefits from this technology.

Of course, you will be given the opportunity to filter all sensitive data from the final report and the data will be made anonymous.

APPENDIX 3. SURVEY COMPOSITION AND QUESTIONS

Survey composition

Country	Business Sector			
	Financial Services	Public Services	Products	Resources
US&Canada	25	15	20	20
Uk&Ireland	20	13	37	7
Germany	25	14	25	17
Italy	23	12	31	16
Spain	26	7	31	9
Brasil	26	5	29	20
China	23	14	29	15
Japan	22	15	24	20
Total	190	95	226	124

Survey questions

Code	Question	Sub-question	Scale
	Thinking about the managerial decisions taken in the marketing, sales and customer service departments or functions, how important is each of the following in terms of aiding or informing the way you market and sell your products and services?		1 Not at all important – 5 very important
Q0301		Simple Data And Facts	
Q0302		More Complex Data Analysis	
Q0303		Intuition	
Q0304		Personal experience	
Q0305		Consultation with colleagues	
	Now thinking about all your customer and prospect data taken as a whole how functional “clean” is it in terms of each of the following characteristics		1 not at all – 5 extremely
Q0401		Accuracy	
Q0402		Format	
Q0403		Completeness	
Q0404		Consistency	
Q0405		Level of integration	
Q0406		Ease of use/understanding	
Q0407		Accessibility	
Q05	Overall, to what extent do you feel that your company’s customer and prospect data and the way it’s used for customer analytics provides your sales and marketing function with an important asset from which new ideas and opportunities are regularly generated?		1 To a great extent – 4 Not at all
	How frequently does each of the following		1 Not at all

	functions use customer analytics?	- 5 very frequently
Q0701	Sales	
Q0702	Marketing	
Q0703	Customer Service	
	Can you tell me which makes [The function chosen in 8 as the most skilled] better than the other functions at using customer analytics?	Yes/no
Q0901	Nature of data available (internal and external)	
Q0902	Quality of data available	
Q0903	Volume of data available	
Q0904	Access to skilled analyst resources	
Q0905	Internal dept staff analytical skills	
Q0906	Focus on/commitment to using analytics	
Q0907	Analytical processes used	
Q0908	Ability to act on insights to improve business outcomes	
Q0909	Other (write in)	
Q10	Which of the following phrases best describes the level of commitment of the senior sales and marketing management team as a whole within this organization to analytics and fact-based decision making?	1= Totally Committed- 5= Not At All Committed
Q12	Now, thinking specifically about your own area of the business and your use of analytics within it, considering all the various issues we talked about today, which of the following statements do you feel best describes what you are currently doing?	1= The Use Of Analytics In My Area Is Currently Very Limited Because We Lack Either The Data, Technology, Analytical Skills And/Or Senior Management Support To Do It Really Effectively 2= There Are Instances Of Effective Analytical Activity In My Area But They Are Uncoordinated And Piecemeal 3= I Have Some Established Analytical Capabilities In My Area And I Intend To Make Significant Improvement In This Area Quickly 4= I Have The Required Human,

		Organizational And Technological Resources And Apply Analytics Regularly With Some Success, But Its Focus Tends To Be Tactical Rather Than Strategic 5= My Area Routinely Uses Analytics Very Successfully As Part Of An Integrated Enterprise Wide Approach Which Is Ingrained Into The Fabric Of The Company 6= Don'T Knowv
	What would you say are the main achievements of your customer and prospect segmentation and analytical work? In other words, which of the following do you believe customer analytics has helped you to accomplish.	Yes-no
Q1701	A tangible increase in sales revenue	
Q1702	A tangible reduction in cost of customer generation/acquisition	
Q1703	A tangible improvement in customer retention	
Q1704	A tangible improvement in ROI per customer	
Q1705	Improved knowledge about the customer	
Q1706	A tangible improvement in time to market for products and services	
Q1707	A tangible improvement in the ability to up and cross sell	
Q1708	Improved direct marketing activities	
	What do you think this improvement would equate to?	Ratio
Q1804	A tangible improvement in customer retention	
	To what extent, if at all, does analytics benefit your sales expansion activities with regard to...	1 Not at all- 5 very beneficial
Q1901	Maintaining and expanding existing customer relationships	
Q1902	Retaining existing customers	

Q1903		Finding and developing new business/new customers
Q25	Business type	B2B, B2C, both equal
Q26	Industry type	Financial services Communication and High Tech Public services Products Resources
Q28	Company size	Ratio

APPENDIX 4. HISTORY OF ANALYTICS WITHIN CASES AND DATA SOURCES

Bank A

Data sources:

- documents available through corporate website and practitioner's case studies;
- an interview with Marketing Intelligence manager (25 years of employment at Bank A).

Before analytics, the company had big large marketing campaigns that were expensive. Moreover, the branches did not have a knowledge who was the customer and there was no overview what was happening with the customer. The lack of knowledge about the customer made it very difficult to spot sales opportunities.

1995 – start of data base management for marketing to improve decision making and marketing campaigns. The data consisted from customer data and transactional data. The first clumsy models to predict the probability that the customer would buy particular product and these were used to target marketing campaigns.

1996-1997 – integrating data from disperses CRM systems and providing functionality in them to predict if the customer is interested in particular product. Moreover, the customer current margin and potential margin was already calculated.

2004 -2008 – deployment of standard CRM systems at each branch. At that time the company also makes the first steps to learn how to combine external and internal data. Also together with customer data and transactional data, the marketing data was used to build even more advanced models. The company learned how to create models based on the other models (combination).

2008 – introduction of signals instead of probability list per customer for B2B. So that each day the account manager gets an alert to whom to call and what kind of product that customer is interested in. It has failed as the hit rate was only 10%, which is too less for human intensive and specialized work (account manager).

2008-2009 – predictive analytics is introduced in more channels such as a call center. The new approach to the prediction was to give again recommendation to the call center or a manager in a shop and then the person could decide to use it or not. Events are used only based on simple facts (not predictions) such as the SME company goes international or buys a new building.

2010-2011 – introduction of internet behavior targeting. So that the data is collected also on internet and analyzed to provide an offer.

Bank B

Data sources:

- documents available through corporate website;
- an interview with Database marketing consultant (3 years of employment at the bank).

2003-2004 – adoption of analytic-driven CRM system. The system functionality allowed mining the data to identify cross-sales opportunity, differentiate customers based on their behavior. However, the effect was hampered by conflicts between marketing channels (as sales as marketing campaigns) as well as company did not know if it was profitable to sell a product to a particular client.

2009 – the company launches the centralized engine to support their multi channel strategy. Before that analytics advantage was not visible due to the big problems to support multi channel strategies.

2010 – restart of building analytical capabilities. The marketing department identifies customer current and potential margins (value) as well as client lifetime value. That makes it easy to make smart decision about what customers to approach and what customers let go. However, cross-sales still does not work due to little cross-sales activities in the past (little data available).

2012 – adoption of another analytical platform that is more compatible with the current IT systems.

Bank C (merged with Bank D)

Data sources:

documents available through corporate website;

an interviews with Marketing Intelligence manager (over 15 years within the bank) and a marketer (over 4 years within the bank)

1994 - 1995 – Bank D starts using analytics to target marketing campaigns. The business need was that the company had no direct contact with the client; therefore, had to spend a lot of money on marketing campaigns. New technology helped not only send to the right customer the campaign and save money, but also provided information on customer needs. Back then the company was already operating across multiple channels: web, mail and a call center. The capability to cross sell, define the value of the client and others were also steadily included and the whole customer strategy was build on analytics.

2003 – BANK C has implemented CRM system on the website, shops (sales) and a call center. The strategy of BANK C was assigning account manager to the customer at local business branches. This helped to achieve personalized approach.

2007 – 2009 - Merge of IT systems and redesign of organization towards Bank D approach, but with some elements of BANK C. The company decided to add to Gamma approach a direct contact with the client through the extensive shop network of BANK C. That helped to provide a good customer experience and also collect some intangible data about the client.

Telco

Data sources:

documents available through corporate website;

an interview with Customer Lifecycle manager (4 years with the company)

2000 - 2001 – analytical activities have started in the Netherlands and gradually were extended.

2006 - 2007 – integration of data about the customer for mature markets.

2011 – deployment of cross-sales functionality for inbound channels across mature markets including the Netherlands.

Automotive Retailer

Data sources:

documents available through the corporate website;

an interview with a Marketing Intelligence manager (over 4 years within the company)

2007 - CRM department is created and integration of one-to-one approach has started

2009 - finished basic integration and start using analytics for one-to-one customer interactions

APPENDIX 5. CULTURAL DOMINANT ATTRIBUTES

<p><u>Clan</u></p> <p>Dominant Attributes: Cohesiveness, participation, teamwork, sense of family</p> <p>Leader-facilitator: Mentor, facilitator, parent figure</p> <p>Bonding: Loyalty, tradition, interpersonal cohesion</p> <p>Strategic emphases: Toward development of human resource, commitment, morale</p>	<p><u>Adhocracy</u></p> <p>Dominant Attributes: Entrepreneurship, adaptability, creativity</p> <p>Leader-facilitator: Entrepreneur, innovator, risk-taker</p> <p>Bonding: Entrepreneurship, flexibility, risk</p> <p>Strategic emphases: Toward innovation, grows, new resources</p>
<p><u>Hierarchy</u></p> <p>Dominant Attributes: Order, rules and regulations, uniformity</p> <p>Leader-facilitator: Coordinator, administrator</p> <p>Bonding: Rules, policies and procedures</p> <p>Strategic emphases: Toward, stability, predictability, smooth operation</p>	<p><u>Market</u></p> <p>Dominant Attributes: Competitiveness, goal achievement</p> <p>Leader-facilitator: Decisive, achievement-oriented</p> <p>Bonding: Goal orientation, production, competition</p> <p>Strategic emphases: Toward competitive advantage and market superiority</p>