EFFECTS OF CUSTOMER RELATIONSHIP MANAGEMENT (CRM) IMPLEMENTATION ON BUSINESS PERFORMANCE IN BUSINESS TO BUSINESS (B2B) MARKETS IN GERMANY

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*refers to main body starting at chapter 1 (p. 18) and excluding ancillary data
“We see our customers as invited guests to a party, and we are the hosts. It’s our job every day to make every important aspect of the customer experience a little bit better.”

Jeff Bezos– CEO Amazon

“Information Technology is at the core of how you do your business”

Satya Nadella – CEO Microsoft
Acknowledgements

An extensive and imprinting project has come to an end after 3.5 years of research including an excellent first teaching year at University of Portsmouth.

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Now, after this incredible project and a long journey has come to an end, I am truly lucky as well as a bit relieved. At the same time, I am looking forward to the next challenge, as challenges and changes are the only constant in life, which helps developing yourself and therefore contribute to a lucky life!

Deeply grateful,

_Manuel_

January 2020
Declaration

Whilst registered as a candidate for the above degree, I have not been registered for any other research award. The results and conclusions embodied in this thesis are the work of the named candidate and have not been submitted for any other academic award.

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

Signature: [Signature]

Date: August 12th, 2020
Abstract

Customer orientation should be the core engine of every organisation. Information technology can be considered as the enabler to generate competitive advantages through customer processes in marketing, sales and service. The impact of information technologies is the biggest risk and at the same time a huge opportunity for any organisation. Research shows that Customer Relationship Management (CRM) enables organisations to perform better and focus more on their customers (e.g. market capitalisation of Amazon). While global enterprises are shaping the future of customer centricity and information technology, the question arises how German B2B organisations can shift their value contribution from product-centric to customer-centric. Therefore, these organisations are attempting to implement CRM software and putting their customers more into focus. However, the question remains, how organisations are approaching the implementation of CRM and if these attempts are paying off in terms of business performance.

Contributing to this highly topical discussion, this thesis contributes to the body of knowledge about the implementation of CRM in the German B2B sector and how it impacts their business performance. First, theoretical frameworks have been developed based on an extensive literature review. Hereby different aspects of CRM are worked-out and mapped against three dimensions of business performance, namely process efficiency, customer satisfaction and financial performance. Based on the theory, a conceptual framework was developed to test the relationships between CRM and Business Performance (BP). Therefore, a survey with 500 participants has been conducted. Based on this a measurement model was developed to test five main hypotheses.

The findings of these hypotheses suggest, that the implementation of CRM positively impacts business performance. In specific, the usage of analytical CRM and the establishment of a dedicated CRM success measurement correlate with the performance of German B2B organisations. In addition to these main findings, various key statements could be derived from the research and a measurement model was developed, which can be used for different organisational characteristics assessing BP. As a result, CRM implementations can be enhanced, and business performance can be improved.
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2. List of abbreviations

aCRM  Analytical CRM
AMOS  Analysis of a moment structures (SPPS module)
AVE  average variance extracted
B2B  Business to business
BP  Business Performance
BP  Business Performance
BSC  Balanced Score Card
CEO  Chief Executive Office
cf.  compare
CFA  Confirmatory Factor Analysis
CLT  Customer lifetime
CLV  Customer lifetime value
CMAT  Customer Management Assessment Tool
CR  composite reliability
CRM  Customer relationship management
DM  Data Mining
e  error (within AMOS model)
e.g.  example given
eCRM  electronic Customer-Relationship-Management
ESB  European school of business
et al.  and others
etc.  et cetera
EU  European Union
FP  Firm performance
GDPR  General Data Protection Regulation
GFI  Goodness of Fit
H1, H2, etc.  Hypothesis 1, Hypothesis 2, etc.
i.e.  in other words
IT  Information technology
KPI  Key performance indicator
KS   Kolmogorov-Smirnov
LSI  latent semantic indexing
M    Million
m€   Million Euro
Max. Maximum
MD   Managing Director
MSE  Medium and small enterprises
n    Size of the sample
NFI  Normed Fit Index
p    p-value / probability
PA   Predictive analysis or analytics
Q    Question
R²   R-Squared
RFM  purchasing period (R), -frequency (F) and -amount (M)
RMSEA Root Mean Square Error of Approximation
RO   Research objective
ROI  Return on investment
RQ   Research question
S&P 500 Standard and Poor - US stock market index
S.E  Standard Error
SaaS Software-as-a-service
SD   Standard deviation
SEM  Structural Equation Modelling
SIC  Squared Inter-Construct Correlations
SME  Small and medium sized enterprises
SPSS Statistical Package for the Social Sciences (Software)
SRMR Standardized Root Mean Squared Residual
SRW  Standard Regression Weight
TCO  Total Cost of Ownership
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>UK RIO</td>
<td>UK Research Integrity Office</td>
</tr>
<tr>
<td>UPO</td>
<td>University of Portsmouth</td>
</tr>
<tr>
<td>USD</td>
<td>United states dollar</td>
</tr>
<tr>
<td>V1, V2, etc.</td>
<td>Version 1, Version 2, etc.</td>
</tr>
<tr>
<td>α</td>
<td>Cronbach’s Alpha</td>
</tr>
<tr>
<td>Δ</td>
<td>Delta</td>
</tr>
<tr>
<td>λ</td>
<td>Lambda</td>
</tr>
<tr>
<td>χ²</td>
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1. Chapter - Introduction

1.1 Background of the study

Researching in the intersection between information technology (IT) and the traditional marketing and sales function has become increasingly important from a practitioner and an academia perspective. From a macro-economic practitioner perspective, Satya Nadella highlights how important information technology has become for every business. The impact of new technologies offers a considerable risk as well as an opportunity for any organisation to realise competitive advantages. Hereby organisations must fulfil customer demands, which are increasingly influenced by IT (Leußer et al., 2011). This covers well-established services like online payment but also more advance requirements such as 24/7 service channels through social media. Thus, services are being transformed due to new technologies and due to fast adaptation of those from customers. As so often, Business to Consumer (B2C) markets are adopting faster, because their customers are demanding those new technologies from the very beginning. Even though Business to Business (B2B) organisations seem to have a little more time to follow, their time is very limited as every B2B professional expects the same purchase possibilities and benefits in business. Within these organisations, marketing and sales represent the direct communication to customers, where it is vital to meet those customer needs (Guenzi & Troilo, 2006). Besides the changing customer needs from the service perspective, new technologies influence and change whole product concepts from isolated products to integrated solutions. These integrated solutions or ‘smart’ products must be incorporated into any customer relationship and service concept, otherwise organisations will face dramatic challenges to stay competitive because isolated products are under high price pressure due to increasing global competition. Due to globalised competitive environment specialised products are not enough to stay at the leading edge of (niche) markets. In addition, big market player such as Amazon invade and penetrate other markets due to their vertical business diversification. Consequently, most of the enterprises that produce specialised products will struggle to maintain their market leader position if they do not provide solutions that combine their high-quality products, with knowledge and with suitable software to enable best-in-class services. Thus, organisations will need to invest more time and resources into their services. This will increase revenue from services while at the same time revenue
from product production will be at least under high pressure. Overall, it can be summarised that markets change from production-oriented markets to service-oriented markets driven by digitalisation. Thus, organisations need to become more customer oriented and assign their limited resources to profitable customers, which makes customer analysis and planning necessary.

The above-mentioned challenges may be relevant for global markets. However, they appear to relevant when talking about German B2B organisations. Most of the B2B organisations in Germany can be considered as large organisations (but not enterprises) whereby family-ownership or leadership can be considered as key characteristic. Moreover, these organisations are innovative, and technology driven (‘made in Germany’). From a marketing and customer perspective, these German B2B organisations are strongly focused on international markets, as most generate a high proportion of their turnover in foreign markets. However, these organisations have not focused on customer orientation or centricity neither on IT solutions. With that said the underdeveloped IT infrastructure in Germany makes it difficult for organisations to deploy modern IT-based services. In addition, German B2B firms have achieved their success mostly through innovative products, and IT-based customer orientation was seldom first priority in any firm strategy (Wolf, Herbert Paul Von Jochen & Zipse, 2009). Customers are more informed and tend to purchase independently without interacting with marketing and sales departments (Nigel, 2014). This makes it difficult to highlight the benefits of products. Not losing the influence within customers purchasing processes, organisations are initiating measures to become extraordinarily customer oriented. Even though these firms are still not best-in-class when it comes to IT-based customer processes, the initiatives are more and more in line with IT strategies and are well underway. This is supported by growing IT applications such as Customer Relationship Management (CRM) and by the huge amount of investments within the German B2B industry (Söllner, 2009).

Looking into those challenges from a micro-economic and respectively business perspective, organisations must react to the new circumstances in order to achieve or maintain a market leading position. Therefore, customer orientation is key to stay competitive and efficient at the same time (Woodruff, 1997). If organisations can achieve higher customer satisfaction with
similar resource input, they will survive in any changing business environment. In order to do so, customer relationship management and analysis practices are key pillars for good business performance and business success. First, many organisations, do not even use a CRM system across their organisation consistently. Different departments use different tools and none of them integrates into another. Theory has discussed success factors of CRM implementation a lot in the past, however, in business practice organisations still fail to implement CRM projects in time and on budget. Consequently, most of the organisations do not have one master customer data base which can be used for coherent customer relationship management and service or analytics. Hence, the consistent usage of customer data is the basic argument, why it is important to consider CRM and analytics in any organisation (Hippner & Wilde, 2003; Park & Kim, 2003). If this central customer database exists, every individual of an organisation can use it for business growth and internal efficiency will be higher due to the reduction in coordinating efforts between employees. Getting rid of data silos, which may be build up and controlled by experienced employees, helps organisations to improve their business performance. Moreover, the enrichment of customer information in a central system allows every individual, especially in marketing and sales, to drive business growth with up- and cross-selling. When combining the common customer database with modern analytical technologies it becomes even more beneficial. In today’s practices many organisations do analysis to identify profitable customers, to spot seasonal turnover development or to react on weak business performance. However, most of those approaches are ad-hoc, non-strategic and often manually executed because the requirements frequently change (Winkelmann, 2013). With one central customer database organisations can apply company-wide standard analyses and extend them to any specific requirement. Moreover, discussion about the accuracy of the master data or correctness of the calculation behind the analysis can be eliminated which again enhances efficiency of whole departments. Analysis in marketing and sales departments are mostly used to allocate marketing budgets and execute campaigns. These budgets can be merged, and campaigns can be executed as a whole marketing programme. As consequence, more leads can be generated and the sales resources can be assigned very specifically. Overall, conversion rates increase and more turnover can be generated. Therefore, a central CRM data base and intelligent and applicable analytics are key to enhance business growth and to
improve internal efficiency which results in a better business performance (Nemati et al., 2003; Roberts et al., 2005).

From an academic perspective there is an extensive amount of literature about CRM and how it is related to Return on Investment (ROI) (Agrawal & Johnson, 2003, 2003; Gummesson & Gummesson, 2004; Shin, 2004), CRM implementation plans (Kozák, 2007; Sharapa, 2009), incorporating CRM into an e-business strategy (Horn et al., 2005; D. W. Lee, 2005; Ragins & Greco, 2003; Zeng et al., 2003). At the same time a large number of studies exists about business and customer analytics (Handzic et al., 2014; Maric & Basic, 2012; Shahraki et al., 2015; Stein et al., 2013). However, so far there are only limited contributions that combine these two elements. Within the CRM theory a distinction between operational, collaborative and analytical CRM is well established whereby the analytical part of CRM aims to investigate analysis approaches within CRM systems (Iriana & Buttle, 2006). Even though increasing attention was spent on those analytical CRM topics, scholars seldom focused specifically on German B2B family firms nor did they consider newest technology from CRM or analytical perspective. Moreover, scholars have not discussed the impact of analytical CRM on business performance in detail. Only a few studies aim at the B2B industry either from a CRM or an analytics standpoint, but the generated findings are mostly derived from case studies, which makes them less meaningful for a whole sector. Other studies investigate the analytical parts of CRM for B2B firms but discuss them rather from a technical or respectively mathematical perspective. Thus, the practical relevance was rather low and marketers struggle to use the findings, especially because no clear managerial recommendations are given. Lastly, scholars have not combined predictive analytics with any CRM research providing general evidence and practical guidance. As the German B2B sector is predominantly strong in Germany, there is a significant importance for the whole economy, to focus on these organisations also from a theoretical perspective.
The academic relevance can be summarised as a knowledge gap about CRM and (predictive) analytics providing evidence on their impact on business performance for German B2B MSEs considering practical relevance and feasibility. Table 1-1 summarises key issues and background of the study.

### Table 1-1: Overview of the background of the study

<table>
<thead>
<tr>
<th>Practitioner macro perspective</th>
<th>Practitioner micro perspective</th>
<th>Academia perspective</th>
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<tbody>
<tr>
<td>- Impact of new IT technology</td>
<td>- Often no company-wide CRM system</td>
<td>- No research in the intersection of CRM and predictive analytics</td>
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<tr>
<td>- Higher service demands</td>
<td>- Many implementations fail</td>
<td>- Analytical CRM is not focusing on German B2B organisations</td>
</tr>
<tr>
<td>- B2C pace maker</td>
<td>- Seldom one central customer database with all information</td>
<td>- CRM literature that focuses family firms does not provide validity for the whole German B2B sector</td>
</tr>
<tr>
<td>- Product focus changes to solution focus</td>
<td>- Manual, ad-hoc analyses</td>
<td>- Correlations of analytical approaches and CRM are not established for German B2B firms</td>
</tr>
<tr>
<td>- Increasing (global) competition</td>
<td>- Need to merge systems</td>
<td>- Limited managerial implications of CRM applications for B2B organisations</td>
</tr>
<tr>
<td>- Limited resources &amp; higher customer orientation requires more planning</td>
<td>- Sales and marketing activities are isolated, not coordinated and are not based on data</td>
<td>- Little consideration of new technology</td>
</tr>
<tr>
<td>- Highly informed customers</td>
<td></td>
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</tbody>
</table>

**Key characteristics of transactional B2B organisations in Germany**

- Underdeveloped IT infrastructure
- Historical company success through products
- Limited customer focus, especially in IT
- Large sized SME
- Family ownership or leadership
- Innovative and technology driven
1.2 Aim and Objectives of the Study

After introducing the importance of the research, this chapter presents the main research aim linked to the research questions. The overall goal of this research can be divided into four areas. From a theoretical perspective new knowledge will be generated in the intersection between CRM and business performance within large enterprises in German B2B markets. Hereby, CRM will be understood as software approach to manage customer relations within marketing, sales and service activities. Moreover, CRM can be divided into operational, collaborative and analytical CRM where the analytical part is clearly in focus for this research.\(^1\)

The methodological aim of this study is to investigate the relationship between the implementation and usage of CRM systems and business performance in the German B2B market. A survey will be administered to collect quantitative evidence of the correlation to enrich the results with explanations based on the literature review. Thus, the study will ensure external validity so that the findings can be applied to the whole population of large B2B enterprises and are not firm-specific. Lastly, managerial implications are provided so that practitioners are able to use the findings within their organisations resulting in a better business performance. In summary, the leading research question is defined as follows:

\textit{How do large German B2B organisations implement and use CRM and what are the effects on their business performance?}

Answering this question, specific research objectives (RO) have been set and will be considered specifically. The research objectives are to:

1. **Identify** and assess how the German B2B sector addresses key CRM concepts within their organisations. In specific, the CRM strategy, implementation planning, analytics and technology as well as the measurement will be investigated.

2. **Evaluate** the impact of those concepts on business performance with regards to internal process efficiency, customer satisfaction and financial performance.

3. **Develop** a research instrument to investigate the relationship between CRM implementation and business performance.

\(^1\) A detailed definition of CRM is provided in chapter 2.3
1.3 Contribution of the study and expected outcomes

As this research is considered a project of a DBA programme, it aims to contributing to knowledge but also to relevant practice. Based on the literature, there are three main contributions to knowledge of this study. First, relevant CRM and analytic literature will be explored and discussed from a German B2B perspective. Hereby, strength, weaknesses and gaps of the recent literature will be identified and key concepts of CRM will be pointed out. Secondly, aspects of business performance will be discussed. Thereby, different perspectives of business performance will be discussed covering the most important areas, such as business process efficiency, customer satisfaction and financial performance. Thirdly, this study will contribute to the body of knowledge by combining major CRM concepts and evaluate their effects on business performance. Hereby, the actual literature will be reviewed giving an overview of possible effects from CRM on BP. Hence a new research topic is targeted and will be tackled from a German B2B industry standpoint, which makes it unique for the academic community. Moreover, modern technology is focused within the literature review, as analytical technologies and applications for CRM are discussed. While many studies have discussed the single topics of CRM itself (Landry et al., 2005; Soltani & Navimipour, 2016) and the analytical part of it (Bijmolt et al., 2010; Germann et al., 2013; Xu & Walton, 2005) and/or business performance (Coltman et al., 2011; Hendricks et al., 2007; Reinartz et al., 2004) this study will contribute specifically with its unique focus on German B2B organisations within the intersection between all three topics.

Methodologically, the study’s contribution is based on a research instrument that allows academics to further explore the relationship between CRM and BP. Therefore, two measurement instruments will be developed. One is going to assess CRM based on different constructs while the other is going to evaluate how to rate business performance for organisations based on several dimensions. Combining these two measurement instruments, one or more research models will be developed to assess the relationship between CRM and BP. Moreover, approaches to distinct this research model will be provided (e.g. test the research model based on organisational size). The findings of this study will be primarily based on quantitative evidence about the correlation between CRM concepts and business and thereby plan and adjust their CRM practice accordingly. Thus, it will be ensured that the
findings are statistically significant and that the empirical proof can be considered as valid for the whole German B2B sector within the defined organisational size. Hence, all findings and interpretations of these findings will be discussed for the whole sector and not as single case-study for individual organisations. With that said, organisations in this sector can prioritise and make better decisions on CRM investments. Moreover, the established research instrument can be used for further research to evaluate the correlations under other circumstances; i.e. for specific industries or regions. As the research instrument is based on a multi-dimensional model, academics and practitioners can investigate the relationship between CRM and BP from various angles. First, the established model enables every organisation to assess their actual CRM implementation and performance based on the gathered data of this study. Second, practitioners and scholars might compare more data sets based on different organisational characteristics and derive more insights. Last and third, scholars can adjust the model and re-assess the dimensions of CRM and/or BP and further develop this model (e.g. industry-specific). By doing so, this research (and its findings) impacts performance of organisations when implementing CRM. At the same time, it enables scholars to deduce further practical frameworks or theoretical models. Overall, this study suggests a proven framework to enhance CRM implementation and offers a starting point for additional methodological research.

Managerially, the study provides major benefits to practitioners. First, it identifies valuable dimensions of CRM that can be used to enhance business performance. Moreover, the study will support organisations to prioritise these dimensions based on the quantitative correlations prior to any implementation attempt. In addition, the quantitative evidence allows managers to argue with real-world statistics within their sector. Consequently, decisions about focusing on specific elements of CRM and analytics can be made based on data which improves the decision making in terms of time and quality. To do so, a summary of the main findings will be provided within a simple framework. This framework will include an overview of the CRM and BP constructs as well as the identified relationships and measures. Hence, practitioners can see how organisations manage their CRM constructs, understand the identified relationships between CRM and BP and finally derive practical actions for their own organisation. Practical guidance on the CRM constructs will be summarised for all marketers
enabling them to achieve a successful CRM implementation. Moreover, the identified impacts on BP will be interpreted as well, so that it is easy to understand for practitioners. Based on the quantitative findings, key statements will be provided giving practitioners advices on how to manage their CRM practice and what to expect in terms of business performance impact.

Table 1-2: Overview of the contributions of the study

<table>
<thead>
<tr>
<th>Contributions to knowledge</th>
<th>Methodological contribution</th>
<th>Managerial contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Review of aCRM literature focusing on B2B organisations in Germany</td>
<td>- Establish two measurement instruments to assess CRM and BP individually</td>
<td>- Identify and evaluate important CRM dimensions for German B2B organisations</td>
</tr>
<tr>
<td>- Identify relevant perspectives of business performance to confront them with CRM concepts</td>
<td>- Develop a research instrument to evaluate the impact from CRM on BP.</td>
<td>- Improve decision making (time and quality) due to the provided correlations</td>
</tr>
<tr>
<td>- Combine CRM concepts and business performance contributing to the body of knowledge</td>
<td>- Provide quantitative evidence about the correlation between aCRM concepts and BP</td>
<td>- Compile a framework to illustrate the relationships between CRM and BP</td>
</tr>
<tr>
<td></td>
<td>- Ensure empirical proof of those correlations for the whole sector in Germany</td>
<td>- Provide key statements about quantitative findings giving advice for CRM practitioners</td>
</tr>
</tbody>
</table>

In conclusion this study steps into an underdeveloped area of practical research, as the German B2B market is overlooked by academics which leads to very limited practical guidance. Table 1-2 summarises the innovative and unique aspects of this study, considering theory and knowledge, methodology and empirical contribution as well as managerial aspects.
1.4 Structure of the Study

After having introduced the aims of the study and its contributions to knowledge, methodology and empiricism as well as practical contributions, this section will shortly outline the structure of the study. Figure 1-1 gives an overview of the study and illustrates how this research will be structured.

Figure 1—1: Structure of the study

First, chapter one introduces the background, aims and objectives of the study. Moreover, expected outcomes and the consequent contributions to knowledge, methodology and practice are presented. Second, the literature review is divided into two chapters. Chapter two tackles the literature around CRM and thereby discusses several concepts of CRM. The first part of this chapter will discuss the strategic dimensions and result in an overview of relevant dimensions. Afterwards success factors for the actual system implementations are being introduced and categorised. Moving on with the analytical part of CRM, section 2.6 introduces several applications and technologies which may be implemented and used by organisations. Based on these CRM themes this thesis discusses CRM rather from a software perspective, because success factors for implementation as well as the analytical technologies and applications are software related. As Payne and Frow (2006) suggest, that the strategic dimension of CRM is also crucial for the software implementation this perspective is also
covered and discussed. Operational and collaborative dimensions of CRM are not focused specifically within this research. Finally, the CMAT model will be used to conclude the discussed CRM themes. Chapter three aims to discuss relevant literature around business performance. By doing so, BP will be defined first before direct and indirect effects of CRM on BP are discussed and assessed according to the different dimensions of BP (i.e. financial, internal efficiency and external customer satisfaction). Thereafter, the time perspective of BP measurement will be discussed by introducing ROI calculation and scorecard approaches as possible methodologies to assess business performance. Lastly, the balances scorecard will be used to conclude the discussed BP topics.

Based on the discussed literature, chapter four develops the conceptual framework as foundation for the research model. Moreover, chapter four develops the hypotheses and discusses the underlying assumptions for each hypothesis. Next, chapter five covers all methodological aspects of this study starting with ethical principles, research philosophy, ontology and epistemology as well as the actual research reasoning and methodology. Then, the research population and sample size will be defined as basis for the survey development. With that said, the survey will be developed in two parts. First the main survey development (e.g. scales, data gathering, etc.) describes how the questionnaire was develop before the second part outlines the operational definition of each questionnaire item. Lastly, the structural equation model (SEM) will be introduced as measurement model.

As next step, chapter six analyses the data which has been gathered. Hereby methodology and conceptual framework are being united. Hence a few analyses are performed within this chapter. First, the data is analysed according to demographic profiles of the participants and their organisations. Second, a descriptive analysis tests the constructs and items of CRM and BP. Based on this, a detailed analysis of reliability and validity is made. Based on a Confirmatory Factor Analysis (CFA) and the analysis of model fit indices, two separate measurement model will be compiled for CRM and BP. Next, a common method bias (CMB) test will be performed before different research models are being developed. These research models are going to be compared and one research model will be used to perform the hypotheses testing. Lastly, the data will be separated according to organisational characteristic which will provide further insides for the hypotheses testing.
With these findings, chapter seven discussed the results from the authors perspective. Within this discussion, the findings of the literature review will be incorporated, and the discussion is organised in two sub-areas. First, the CRM and BP constructs (within the selected research model) are being discussed and the relationships between these constructs are interpreted. Second, the results from the hypotheses testing are discussed. Hereby, a general discussion provides answers for the main research question while the underlying hypotheses offer further details to explain the findings. Finally, chapter eight concludes this research project with a summary of the main findings. To close a circle, the contributions will be presented and thereby assessed against the expected outcomes in chapter one. Moreover, managerial implications are being provided to ensure a practical relevance of these contributions. Lastly, limitations and areas for future research are being discussed.
2. Chapter – The Theory of Customer Relationship Management (CRM)

2.1 Introduction

CRM as a concept emerged after 1990 to develop customer relationships with the support of arising information technology and software solutions (Reichheld & Teal, 1996; Roberts et al., 2005). With increasing technological possibilities, the trend around CRM has grown in the past decades. Moreover, the combination of increasing customer relationships and the desire of unique customer treatment has become a major challenge of every organisation. Hereby, organisations can focus on multiple dimensions and elements of CRM. Therefore, this section discusses the following CRM topics:

- Historical review of CRM literature
- Definition of Analytical CRM
- Dimensions of CRM
- Success factors for implementation and adaptation
- Measurement of success / Return on Investment

This study aims to tackle those challenges and therefore the following sections provide a clear overview of the existing CRM theory. With that said, the focus of this chapter is set on the analytical part of CRM and its applications. The historical review gives an indication on how the body of knowledge has developed. This chronological review drafts key concepts of discussions from 1990 until today.

2.2 Historical review of CRM literature

Customer Relationship Management (CRM) has emerged in the 1990s as concept to manage the relationship from existing and future customers. The concept of CRM is as old as sales itself. However, the interest raised due to the emerging information technologies which enabled organisations to manage their customer relations in a central system. Initiating this chapter with a chronological review, it must be stated, that until the 1990s no peer reviewed research articles about CRM in the B2B context were found.
This has already changed in the first five years from 1990 until 1995 where early authors were investigating if customers are telling the truth in services (Engelland, 1992), how to manage customer in a multi-cultural environment (Mårtenson, 1992) and how leadership and organisations can enhance the success of CRM by managing and training people (Agur et al., 1995; Schiewe, 1995). In the same year Sheth and Parvatiyar (1995) have argued that the core idea of CRM was already known as relationship marketing in the industrial era. Thereby they discuss the involvement of customers in early stages of the value chain and the appearance of intermediaries in the sales process. Interestingly, these topics are pertinent for academics and practitioners today because modern technology allows discussing them in a new context with the same core questions. For instance, relationship marketing was from interest in the industrial era and is more important than ever before due to the usage of social media and the current corresponding power of word-of-mouth advertisement. In this context, recent literature suggests, CRM should put people (and all their relationships with the firm) into the centre of their marketing activities and thereby incorporate social media into their CRM strategy (Quinton, 2013).

From 1996 until the turn of the millennium, more research and articles were emerging in the field of B2B and CRM. Galbreath and Rogers (1999) described CRM as new technology, which allows a better management of customer relations. For this purpose, processes, IT, organisations and people management are key challenges to be considered. At that time first peer reviewed articles were published as well. Hence empirical investigations were made in the field of B2B marketing and the relationship of customers in the service sector (Eng, 1999). Other publications investigate CRM industry specific, for instances within the field of financial industry (Zimmermann & Korner, 2000). Those authors developed approaches how relations between supplier and customers can be better managed under the influence of the digital economy and technology. Besides a few peer reviewed articles, many other researchers have investigated the interdependency between E-Business strategy and CRM (Caldwell, 2000; Drucker, 2000; Vizard, 2000; Wilkinson, 2000). Other studies have focused on first software selection guidelines (Nelson, 2000), observed impacts on organisations, processes or CRM business models (Nykamp & McEachern, 1999; Trepper, 2000). Additionally customers were coming more into focus of whole business strategies and research has made first attempts to
demonstrate the benefits of CRM implementations (Kissinger, 2000). Due to the raise of software vendors penetrating the market and with companies like Amazon disrupting whole industries, customer orientation and people management within IT projects have become key aspects of any CRM discussion, especially from an analytical perspective. While authors have discussed customer orientation as general concept to think about around the turn of the millennium, today’s discussions are leading those thoughts to the next level. While CRM systems were used to exchange static information in the past, today’s business requirements demand real-time collaboration and advanced analytics from any system. In doing so, companies must focus more on people and change management and software vendors are forced to develop and market CRM product innovations to stay competitive.

In the five years after the millennium turn from 2001 until 2005 peer reviewed research has focused mainly on two specific areas. Based on the conducted research from 1996 – 2000 some studies have further explored the association between CRM and the E-Business environment (Horn et al., 2005; D. W. Lee, 2005; Ragins & Greco, 2003; Zeng et al., 2003). Researchers have also systematically evaluated the benefits of CRM by investigating Return on Investment factors (Agrawal & Johnson, 2003; Gummesson & Gunmesson, 2004; Shin, 2004). Those ROI investigations were focusing on internal performance indicators of organisations (Gummesson & Gunmesson, 2004; Shin, 2004) but so far there have been no attempts to incorporate the outside customer perspective when determining CRM return on investments. With the increasing interest in customer centricity, today’s discussions about ROI and the incorporation of CRM into e-business strategies have evolved. Due to cloud technology ROI discussions are on a different level and software-as-a-service (SaaS) allows organisations to adjust their software applications immediately. This leads to the necessity of strategic approaches and educated people who combine single IT projects to digitalisation programs. However, the lack of personnel and the relatively high implementation costs are still driving discussions about ROI metrics within CRM.

The research results from 2006 until 2010 has widened the body of knowledge in various topics such as demonstrating the missing link between E-Business performance and CRM. However, the majority of research studies have demonstrated that process management (Al-Mudimigh, 2007; Guo & Liu, 2010; Lambert, 2010; Tamošiuniene & Jasilioniene, 2007) and the
incorporation of CRM into the business strategy (Schilke et al., 2009) is necessary when introducing CRM programmes and systems. Those strategical process management approaches were considered when implementing CRM to B2B organisations. Furthermore organisational characteristics (Ko et al., 2008) and frameworks (Kozák, 2007; Sharapa, 2009) for the implementation of CRM systems were investigated by several authors. Lastly, business intelligence concepts have been associated with CRM in conferences (Habul & Pilav-Velic, 2010; Lihe et al., 2008) as well as with the first established model which could be applied for online retailers and catalogues (Phan & Vogel, 2010). With emerging new concepts (e.g. business intelligence), the integration of CRM into business strategy becomes more complex. Moreover, the increasing amount of data allows organisations to generate better insights, which they use to define their strategies. Consequently, CRM data is not only a data source for sales people anymore but also an essential factor for any business strategy.

Recent studies from 2011 until today have not only introduced a more holistic approach of CRM including marketing, sales and service but also the integration of internal supply-chain functions aiming at better financial outcomes when managing customer relations (Giannakis-Bompolis & Boutsouki, 2014; Jafari Navimipour & Soltani, 2016). For instances, the importance of Marketing for SMEs is highlighted by Quinton (2016) stating that also SMEs should consider digital channels where B2B customers are retrieving information and purchase. To do so, different targets and components of CRM systems can be defined. Mostly, four categories are discussed within the literature. These categories include strategic, operational, collaborative and analytical CRM (Alavi et al., 2012; Iriana & Buttle, 2006). All of them will be introduced in chapter 2.3, when defining CRM.

Before the definition of the focus of CRM within this study, some insights from other relevant studies are introduced. Those studies have been focusing on diffusing CRM with business intelligence approaches to improve customer relations and to use successful customer management models (Handzic et al., 2014; Maric & Basic, 2012; Shahraki et al., 2015; Stein et al., 2013). Thereby social media plays a vital role. Many researches focus on the integration of social networks and data into CRM systems. The combinations of those two areas were investigated and thereby the influence of social media and networks is regularly discussed. Moreover, the impact on tailored marketing and sales activities as well as on the overall
The enhancement and enlargement of CRM concepts (such as integrating social networks) have caused the need for additional research on the output of CRM systems after the implementation. Thereby studies have explored the effect of CRM on customer satisfaction and loyalty (Hapsari et al., 2016; Hassan et al., 2015; Rahman & Ramli, 2016; Raineri, 2011). Achieving those benefits in the age of digitalisation, implementation strategies and frameworks have been improved as well (LipiäInen, 2015). As the amount of identified studies and articles on social media and CRM indicates, that the area around ‘Social CRM’ is a key topic in the field of CRM research and may have an influence on the research in the field of PA and CRM. After reviewing the past concepts of CRM and assembling them briefly with today’s environment, the following section will develop a working definition of CRM for this study.

2.3 Perspectives and definition of CRM

CRM is the key area of this research and requires an adequate definition to ensure a correct understanding. Therefore, definitions of German and Anglo-Saxon experts will be compared, and the view of software institutions will be incorporated to derive an own definition of what CRM stands for within this research.

The ‘German’ MSE B2B perspective

Hofbauer and Hellwig (2009) include all activities such as planning, analysing, implementing and controlling the relationship to customers. This definition has its origin in the increasing importance of Relationship Marketing since the 1980s. At that time, authors expanded the pure transactional perspective of marketing and sales activities to incorporate the management of customer relationship with the aim to deliver value for customers and companies. Consequently, they also separated transactional and relational marketing practices when discussing the concept of CRM. Lastly, Hofbauer and Hellwig (2009) have developed a CRM funnel which classifies CRM as connecting concept between the corporate strategy and the processes in marketing, sales and service. Finnegan and Currie (2010) highlight, that CRM is
often defined narrowly as technical solution to manage customer relations but ignoring the link with marketing and sales.

Winkelmann (2010) – as leading sales author for the German B2B industry – describes CRM from several perspectives. From a working perspective, CRM includes all activities from target group definition, about customer identification, the value presentation for the customers until the actual sales transactions. Furthermore, he groups all these activities into marketing, sales and service activities. Moreover, the fusion of the activities across different departments is a key target of CRM as programme. Hence CRM also includes the establishment of methodologies, processes and systems (Winkelmann, 2013).

**The ‘Anglo-Saxon’ perspective**

Jobber and Ellis-Chadwick (2013) describe CRM from a conceptual perspective, which moves away from the transactional part, where the sales man focuses on closing the deal and taking the order to a long-term customer orientation. Hence, the sales function is the core element of any organisation achieving competitive advantage, because they place the customer at the centre of all their activities. Following this approach, CRM is defined as a holistic concept to create win-win situations and long-term relations across the marketing, sales and service processes without mentioning the software perspective of CRM at all.

This is supported by another definition which highlights the usage of information, technology and processes to organise the relationship with customers including marketing, sales and service (Kincaid, 2003). For a streamlined management of CRM along the value chain four CRM categories have been established and elaborated by several authors (Alavi et al., 2012).

- **Operational** CRM describes all activities which are being performed to increase efficiency of the whole organisation in its core processes in marketing, sales, internal services and responses from suppliers (A. W. Johnson et al., 2014; Mirzahosseinion & Piplani, 2013).

- **Collaborative** CRM focuses very much on the cooperation and communication part of customer management either inside a sales team or with the customer integrating IT systems to merge communication channels and customer interactions (Khodakarami & Chan, 2014; Marginean, 2009).
• **Strategic** CRM summarises all strategic aspects around CRM, including technology, the incorporation of business processes and the alignment within the overall business strategy (Bull, 2003; Heinrich & Johannesson, 2005). The dimensions of strategic CRM will be discussed in detail in chapter 2.4.

• **Analytical** CRM (aCRM)\(^2\) covers all areas around the gathering, investigation and deriving of results from customer data as well as the linkage to customer knowledge management (Nemati et al., 2003; Thompson, 2011). Thus, integrated processes, models and systems coordinate and measure such activities. Surely, aCRM becomes increasingly important as technology capabilities are improving and businesses require more analytics to stay competitive.

The ‘software’ perspective

Implemented systems are key to manage information around the customer. CRM systems are defined in various ways from different authors. Based on the findings from Saeed et al. (2011) the key points of a CRM-system can be described by managing all activities, information, interactions and processes regarding the customers.

Looking at the leading CRM system providers, Microsoft defines CRM as data driven solution which should improve your profitability by offering better customer interactions (Microsoft, 2017). Salesforce, as market leader, concludes CRM as technology to manage all relations and interactions with prospects and customers to improve business relationship (Salesforce, 2017).

Lastly, the view of Gartner as leading analysts, encompasses CRM as business strategy to optimise revenue based on satisfied customers whereby the technology covers sales, marketing, service and digital commerce (Gartner, 2005, 2013).

**Working definition:**

Concluding the concepts and perspectives above, CRM is defined as a system that manages all practices around customer relationship and aims to increase turnover and efficiency managing all activities in marketing, sales and customer service. Especially the interaction via digital channels can be focused since the data generation is reliant on those communication

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\(^2\) This research will enlarge the body of knowledge in the area predictive analytics and CRM and therefore it will be allocated to this section of analytic CRM but may also have consequences on the other fields of CRM.
channels. However, in the German B2B environment the adoption of digital communication channels progresses rather slowly. Independently from the communication channels, the activities across the value chain between marketing, sales and customer service need to be merged and systematically tracked to analyse data and derive business actions from it. To do so, the terminology of analytical CRM must be understood and defined as well. As this dissertation will focus on the analytics perspective of CRM as a software, aCRM will be explained and defined in Chapter 2.6. Consequently, collaboration and operational viewpoints are less focused, while strategic elements are considered to adopt a software related perspective comparing successful CRM implementations of with the actual business performance.

In summary, CRM is defined as follows for the purpose of this study:

> CRM is a systematic software to manage and align all activities in marketing, sales and customer service. It aims to enhance customer satisfaction and internal processes to increase turnover and improve efficiency. Achieving this, a key element of CRM is the analytical part that focuses on data gathering and evaluation for the derivation of business actions.

### 2.4 Strategic dimensions of CRM

After giving a working definition, this section will discuss different strategic dimensions of CRM, which are relevant to determine the scope of the CRM usage. This is important to consider, as organisations need to focus on a digital orientation (e.g. market or learning orientation) to remain or even improve their performance (Quinton et al., 2018).

Recent studies give a rough distinction between conceptual and technological elements of CRM. Studies that propose conceptual strategies are focusing on different parts of CRM within the value chain of an organisation (i.e. marketing, sales and customer service). Payne and Frow (2005) describe CRM as a conceptual framework of five elements. Within their framework, strategy defines the value creation process and thereby the actual customer channel management and a conclusive assessment process. IT tools are ‘only’ a supportive element in this framework, but they do not have a pro-active role. Many others (Akter et al., 2016; e.g. Bull, 2003; Campbell & Cunningham, 1983; Roberts et al., 2005) agree that strategy is a key
component for CRM success, either as software implementation or as company-wide initiative. In saying so, some describe it as companywide strategy and initiative that includes value creation, channel management, IT systems and performance measurement targeting higher customer satisfaction and lower operational costs (Bohling et al., 2006; I. J. Chen & Popovich, 2003). Complementary to this strategic view, process views do exist whereby CRM is described as a subsequence of activities to manage customer relationship and/or to implement the corresponding CRM system (Heinrich & Johannesson, 2005; Srivastava et al., 1999). Iriana and Buttle (2006) research discusses strategic operational and analytical attributes of CRM and thereby measures items that defined those attributes. However, the ‘traditional’ perspectives (i.e. strategic, operational and analytical) are only one view to contemplate CRM and their distinction is relatively obvious and described within the definition section above.

Winer (2001), on the other hand, looks at CRM from a customer perspective. In doing so, his study distinguishes between direct and indirect customer interaction and thereby considers the interaction frequency. This metric separates customers into different groups for marketing and communication purposes or for general customer analytics. In contrast to a rigid classification into groups, customers are passing different processes steps during their journey. Hereby companies identify customers first when they are in their orientation phase, before they try to attract them with marketing activities in the information gathering stage. At this point traditional sales tasks are starting as well. If the prospect could be convinced and becomes a customer, marketing and sales activities should be aligned to keep customer retention high and thereby realise cross- and up-selling potentials (Ngai et al., 2009).

To do so different sales professionals and marketers use different channels to communicate with customers. Those channels are evolving especially through the influence of modern technology. In the past, organisations focused their channel strategy on traditional communication activities like phone calls, sales visits and fax. In today’s technologically influenced world customers expect modern communication and organisations are trying to fulfil this demand and deploy online and mobile channels with corresponding activities like customer service via ‘WhatsApp’ or Online Self-Service portals. Hereby, recent articles introduce new concepts to the literature, such as social (Pilav-Velic et al., 2015; M. Rodriguez & Peterson, 2012; Woodcock et al., 2011) or mobile CRM (Drennan, 2002; Purnima & Preety,
and discuss more established terminologies like ‘eCRM’ (Mastorakis et al., 2015; Nemati et al., 2003). Obviously, IT is not ‘only’ a supportive tool anymore but becomes the major pillar implementing those channel communications. Some might even consider it a competitive advantage, if an organisation can merge modern IT with their channel management within CRM applications. Thereby technology must be understood as key enabler for any organisation but also it must be regarded that technology is something your customers have to adopt. Otherwise, all efforts into modern technology will deflagrate, especially from an operational channel management perspective.

As seen, different articles approach CRM from different strategic perspectives. However, they all have in common that CRM tries to maximise the output of given market circumstances. Therefore, organisations identify market potential and customer requirements and ‘process’ them most efficiently through their CRM value chain. As a result, firms want to achieve higher profitability either through processes that are more efficient or through the realisation of more turnover with equal resources. In conclusion, figure 2-1 summarises the different dimensions of CRM that are available within the literature and unites them in one holistic sight. In addition, a summary of key articles provides a more author-specific overview about the topic in appendix 1.

Figure 2—1: CRM Strategy Framework
The figure separates between an external and internal perspectives of strategic CRM and incorporates three dimensions of CRM. First, the customer value creation includes all activities that generate a benefit for the customers (e.g. marketing campaigns, sales visits or 24h customer services). Second, the channel management as ‘interaction connector’ between organisations and its customers; i.e. all possible communication channels. Third, the customer (buying) process which includes all activities and demands of customers within their lifecycle.

These three elements are surrounded by the overlying strategy and available technology. Both, strategy and technology, provide the boundaries for any CRM practice and are influenced by external customer requirements as well as by the organisational need to exploit market potential. The target of this CRM strategy framework is to enhance customer orientation and to increase process efficiency. Therefore, operational and analytical elements of CRM focus on the customer processes; the channel management and the value creation to increase profitability. An example for this strategic framework might be:

*A German B2B organisation identifies a huge market potential for car batteries in China. To exploit this potential, they define a CRM initiative within their strategy to increase the number of customers in China. The marketing department works on a media campaign, which targets all car manufacturer in china, that are producing electric cars. To identify interesting prospects the German B2B organisation uses personal meetings with leading politicians and industry experts. Simultaneously, they use a mixed online- and mobile campaign to promote their batteries for car producing companies. By combining the responses of their campaign and the insights from the local politicians, they generate a ‘hot lead’ list and analyse these organisations based on purchasing power and future car sales per region. As a result, top target accounts will be contacted from sales by phone and with personal visits to sell their batteries as well as to offer batterie loading stations in relevant cities for the end customers of the car producer.*
Based on this example and the discussion within this chapter, CRM Strategy is formally defined as follows:

**CRM Strategy is one key dimension of CRM (besides operational, collaborative and analytical) and incorporates the customer as well as the business processes of an organisation which are linked with a sound channel management. Hereby, customer requirements are important circumstances for the CRM strategy and customer orientation and process efficiency are targeted results of the strategy. To achieve this, CRM strategy must be embedded within the overall business strategy and supported by information technology.**

After having explained and illustrated the CRM Strategy Framework the following section will discuss success factors for the implementation and adaption as this is a further key concept of CRM success.

### 2.5 Success factors for implementation and adaption

CRM is such a multi-dimensional and important topic for organisations to survive, but what are the reasons for shocking statistics such as Gartner (2005) statement of 70% failure rate for CRM implementations? This section discusses relevant factors that are important for the implementation and adaptation of a CRM system. Hereby a strong focus is set on articles that provide scientific evidence.

According to recent literature, the factors for a successful CRM implementation are mainly grouped into two areas, which are (1) technology and innovation as well as (2) process, people and organisation. Those two areas are key for a successful CRM implementations with a high adoption rate.

#### 1. Technology and innovation

From a technology perspective, it seems obvious that the actual software capabilities are important for the success of CRM. Hence, organisations must focus on the adoption of modern technologies, which enables them to drive innovation forward and create new services for their customers (Beynon et al., 2020). For instances, cloud technology as a key driver of the ‘visible’ performance (i.e. responsiveness) for users. Of course, the growth of the internet mainly influences this development and enables organisations to access and manage much greater customer data and thereby establish digital customer relationships (I. J. Chen &
Popovich, 2003). Overall several authors (Becker et al., 2009; W. Chang et al., 2010; Šebjan et al., 2016) agree that a general technology orientation helps to increase the implementation success even though some studies counter this agreement, such as Croteau and Li (2003) who argue that there is no significant correlation between technology readiness and CRM impact. Technology orientation applies to CRM projects itself as well as to the companywide technology orientation.

Besides the affinity to technology, data quality plays an increasingly important role as the amount of data and the possibilities for its analytics is heavily growing. At the core of data quality, the data consistency and the actual state of databases are the key issues (Alshawi et al., 2011) and its consequences are widely known. In the study of Alshawi et al. (2011), many interviewees complained about the problems of a bad customer database and its consequences that customers even complain about it. Multiple authors support that this is well-known and at the same time highly underestimated in industries (Berry & Linoff, 2000; Ryals & Knox, 2001). To overcome these major problems and to gain control of the consequences of data quality, data tools are becoming more important. Professionals might be aware of data quality tools (Alshawi et al., 2003) but there seems to be a lack of IT experts or data analysts who deploy these tools in organisations, especially in Germany (Ernst & Young, 2018). In this context, Chen and Popovich (2003) discuss data warehouse technology, which allows organisations to have instant access to large data sets and thereby improve the analytical capabilities of organisations as well as the possibilities to clean up data (i.e. identify inconsistent data; consolidate duplication data, etc.).

Implementation costs and the changes in IT infrastructure are two additional and very important factors. Implementation costs are a key metrics to measure the project success and therefore are essential to manage management expectations successfully (Cooper, 1994; Dalcher & Genus, 2003). Unfortunately, this becomes very often an issue for professional project managers if the initial scope of a CRM project required a change to ensure functional benefits for users. Besides the monetary costs, timing is also key to keep up the fast speed within a CRM programme. Due to customers who are demanding more and more digital and online services paired with the lack of IT experts, most organisations cannot afford to develop their own flexible and powerful CRM system (Bull, 2003; Welsch, 2001). Consequently, many firms deploy Software-as-a-Service and thereby benefit from cloud services. Through this
outsourcing trend many professionals are concerned about the support of software vendors (AlShawi, 2016) and at the same time the IT infrastructure changes dramatically. In the past, (most) software solutions were hosted on-premise with ‘own’ hardware in an ‘own’ datacentre and therefore with and full control about the data. With today’s requirements to flexibility, organisations are losing control of data and parts of the IT infrastructure will be outsourced to external datacentres. Organisations must plan and consider these new circumstances when implementing CRM systems, otherwise they will fail because the changes in their infrastructure cannot be installed in time or a proper ongoing management of it cannot be ensured (Ndubisi & Jantan, 2003; Themistocleous et al., 2004).

In this context, the research of Šebjan et al. (2016) shows that innovation (rather from a functional than from a technical perspective) has the biggest impact on the positive attitude towards the usage of analytical CRM tools. For this reason, they distinguish innovation-orientated organisations into two parts. The identification and development of new ideas and approaches are the first element, while the corresponding tools and technologies are the second element of an innovation-oriented organisation. The results show that both elements have a positive correlation towards the attitude of using aCRM tools. Many other authors highlight, that innovation plays a key role as success factor for CRM implementations (Alshawi et al., 2011; Baars & Kemper, 2008; Chen & Popovich, 2003). However, the literature considers innovation mostly as something that needs management support, but without precise discussions in the context of aCRM. Consequently, this area seems to be underdeveloped as critical success factors for any CRM implementation. Although innovation does not receive the greatest attention, if authors address innovation as something to be important, they relate it to the necessary culture and therefore to people.

2. Process, people and organisation

CRM implementations are mostly associated with business process changes and consequently affect the organisational flow. Šebjan et al. (2016) reference some studies that focus on the organisational factors of successful CRM applications (Bavarsad & Hosseinipour, 2013; Kavosh et al., 2015; Sarmaniotis et al., 2013). From an organisational perspective, studies show that a customer orientation supports the success of implementations. Thereby customer orientation aims to increase revenue, customer loyalty and reduce the process costs (Chen & Popovich, 2003). From a process specific perspective, Šebjan et al. (2016) confirm the
hypotheses that a higher process orientation leads to a more positive attitude of CRM usage. To get there, the traditional product orientation must be transferred to a modern customer orientation that enables companies to focus on business processes that provide a positive outcome for customers. To do so Seybold et al.; Seybold and Marshak (2001; 1998) suggest five steps designing a customer centric organisation. In these five steps, they are focusing on becoming proactive with end customers with improved flows between back and front office so that it is easy for customers to do business with the organisation.

Managers must consider customer orientation within the business processes but also within the overall business strategy. The qualitative findings of Alshawi et al. (2011) indicate that managerial support is indispensable for the success of any CRM implementation. Many other authors support these findings and thereby highlight the necessity of the engagement from top management (Baars & Kemper, 2008; Bull, 2003; Chen & Popovich, 2003; Croteau & Li, 2003). To achieve this, literature suggest communicating pro-actively the benefits of a CRM implementation to all stakeholders and to ascertain that the implementation is not only a software project. Instead, every individual of the organisation must understand that it is an essential customer initiative that is crucial for business success and there part of the overall business strategy (Eng, 1999; Goodhue et al., 2002; Seyal et al., 2007; Themistocleous et al., 2004). Therefore, it is important not to ignore the individual people perspective as additional success factors.

Most of the authors imply that people will fit into organisational processes and structures and that those measures will apply to every individual. However, looking at the articles from authors who argue from an individual people perspective they also state that top management support and a cultural change is necessary to convince the individuals of any organisation (Al-Mashari & Zairi, 2000). The key difference thereby is the additional investments in training and change management that focuses on every individual, at least per role-, within the organisation. With a solid training and change management in place, new business processes and structures do not only guide people but also they can be convinced to engage and fully support the CRM implementation (Alshawi et al., 2011; Shum et al., 2008).

Overall, if CRM initiatives support the organisational business strategy and a solid communication, training and change management is in place the technical benefits can create innovation and organisation can achieve competitive advantages in the marketplace.
Table 2-1: Key success factors affecting CRM implementation

<table>
<thead>
<tr>
<th>Technology and Innovation</th>
<th>Process, people and organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Technology orientation of an organisation</td>
<td>+ Consideration of business process changes</td>
</tr>
<tr>
<td>+ Management of data quality</td>
<td>+ Support customer orientation as part of the overall business strategy</td>
</tr>
<tr>
<td>+ Transparency about implementation costs</td>
<td>+ Engagement from top management</td>
</tr>
<tr>
<td>+ Technical feasibility for changes in IT infrastructure</td>
<td>+ Professional communication of CRM benefits</td>
</tr>
<tr>
<td>+ Create an innovation culture; i.e. support the identification and development of new ideas and approaches</td>
<td>+ Support cultural change</td>
</tr>
<tr>
<td>+ Usage of technologies and tools to create and evolve ideas</td>
<td>+ Be aware of individuals</td>
</tr>
<tr>
<td></td>
<td>+ Ensure effective training and change management</td>
</tr>
</tbody>
</table>

Table 2-1 summarises the discussed aspects (i.e. key success factors for CRM implementations) according to technology and innovation and process, people and organisations. The consecutive section continues with the analytical perspective of CRM.

2.6 Analytic functions of CRM Software

So far, the previous sections have discussed the history, the definition and dimensions as well as the relevant success factors for CRM in general. The following sections discuss the analytical part of CRM in more depth by elaborating on the major functionalities, respectively technologies. To do so, this chapter includes the following sections.

1. Data Mining (DM) as main aCRM technology and its key areas
2. Main aCRM applications
3. Introduction of Predictive analytics
4. Specific applications and models of Predictive Analytics
5. Key technologies to apply Predictive Analytics

Before the next section starts with data mining as key concept, it must be highlighted, that the discussed analytical applications will be considered in two ways. On the one side, data mining may be technically realised and helps organisations to automatize their analytics within CRM. On the other side, the actual application (e.g. classification) might be also relevant, because organisations apply it without data mining technologies but as analysis in other formats, for instances in Excel.
Figure 2—2: Coherence of aCRM, DM and PA

<table>
<thead>
<tr>
<th>CRM</th>
<th>Analytical CRM</th>
<th>Data Mining (using machine learning)</th>
<th>Predictive Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other aspects of CRM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.g. Strategic operational, collaborative, etc.</td>
<td>Other aspects of aCRM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.g. Knowledge management; data interpretation, etc.</td>
<td>Other aspects of DM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.g. Data processing and transformation, ethics, etc.</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Figure 2-2 gives an overview of relevant concepts and puts them into the right context. As discussed earlier, aCRM can be considered as one dimension of CRM. Analytical CRM refers to many aspects, such as knowledge management, data quality, data governance, relevant technologies etc. Moreover, the actual analysis within CRM can be further differentiated. For instances, Xu and Walton (2005) suggest to differentiate customer groups (existing vs. prospects) and the analysis itself (Profiling vs. Pattern), to acquire more customer knowledge. As DM is a major technology part of analytical CRM it will be focused and includes many aspects, such as data processing, ethical considerations, algorithms to execute the analysis, etc. For this study, DM will be discussed in the next sections covering all relevant technologies (i.e. how to analyse) and applications (i.e. what to analyse). Afterwards, Predictive analytics (PA) will be discussed likewise to elaborate possible applications and technologies for the German B2B industry, as PA can be seen as sub-category of DM. While DM is characterised as more static analytics using existing data (mostly from the past), PA is characterised as more dynamic analytics trying to predict specific events and thereby generate results for the future.

In summary, analytical CRM (aCRM) is defined as follows for this study:

*Analytical CRM is one key aspect of the CRM software (besides the operational, collaborative and strategic perspective). Analytical CRM mainly focuses on data gathering and analysis as well as the corresponding interpretation of the data. To do so, technologies (mainly data mining and predictive analytics) are technological preconditions to develop and apply business applications within the CRM system (e.g. sales analysis or customer profiling). While Data Mining can be seen as main (static) technology to analyse available data, predictive analytics is able to enrich these analytics with future-oriented analysis models.*

The following section discusses DM within the context of aCRM before the subsequent section gives an overview about the major application.
2.6.1 Data mining: The main aCRM technology and its key areas

First, DM needs a rough definition and explanation within the concept of aCRM. Data Mining can be defined as the procedure to explore huge amounts of data to discover patterns and associations (Linoff & Berry, 2011). Other authors describe data mining as information technology which is useful to receive valuable customer data and based on this they use data to identify customer demands and define corresponding promotional actions (Zhang et al., 2006). Within this information technology, machine learning is one technology that can be used to perform data mining applications. Most research articles highlight the importance of data mining as an emerging analysis tool and outline the benefits (such as better customer segmentation or reserving better customer value) which can be achieved when using it properly in combination with CRM (Han et al., 2012; Plessis & Boon, 2004; Yan et al., 2009). Consequently, DM itself receives increasing intension as the amount and availability of data increases rapidly. Because organisations are aiming to make use of data, they develop new technologies to do so – DM is one of them and tries to identify patterns in data and thereby generates results as automatically as possible. As a result, firms that are investing in DM expect to extract valuable insights and generate new knowledge from the unstructured data (Han et al., 2012; Witten, 2017).

Based on this new knowledge, organisations can improve customer satisfaction, increase the profitability and finally achieve competitive advantages (Jafari Navimipour & Soltani, 2016; Soltani & Navimipour, 2016). Linoff and Berry (2011) present a full set of possible applications for data mining within the context of CRM. Thereby they discuss applications along the customer lifecycles such as identifying prospects, activating existing customers, realise up- and cross-selling potentials and finally reduce customer churn or respectively increase customer winback. For such applications, DM is considered as the key technology (Qiaohongi et al., 2007). Ngai et al. (2009) support the argument and categorise DM techniques in four areas within the CRM environment by suggesting customer identification, attraction, retention and development as key stages. To identify data patterns, new techniques based on new technologies have been emerged. Analysing them Ngai et al. (2009) and Berry and Linoff (2004) give an overview of DM functionalities / technologies which are a good starting point:
**Clustering** can be described as the separation of data or information into similar groups. It is a data modelling technique which is the foundation for the actual mining of the data, after the clusters have been built. It can be used for large data sets to build groups and categorise data (e.g. customer groups). Thus, there are many applications for clustering, also in business research and practice (Berkhin, 2006; Chang & Ho, 2017; Kogan et al., 2006).

**Classification** at the same time is very similar to clustering. The only difference is, that classification assigns all data to (predefined) groups while clustering groups the data as much as needed to cluster all of them into different categories without predefined groups. Both applications are quite relevant for many organisations, as they have to manage more and more customer data. Customer communication, pricing and even products can change between the clusters. To generate such clusters, it is possible to use different methods, such as portioning, hierarchical, density-based or grid-based clustering. Without discussing these methods in detail, it is key to understand, that the outcome of the clusters varies dependent on the used method (Ahmed, 2004; Berry & Linoff, 2004; Giraud-Carrier & Povel, 2003; Mitra et al., 2002). The following three examples provide an overview of practical DM applications:

1. Jiang et al. (2013) use data mining techniques to evaluated GPS data from customers and match them with socio demographic data such as gender, age, etc. Those 50,000 customer data sets are used as basis for a clustering algorithm which suggests customer groups for specific sales and marketing activities.
2. Hosseini et al. (2010) focus on customer classification in the finance sector aiming at higher customer loyalty. By combining existing statistical models, they identify enormous potential for the firms to incorporate customer loyalty into their marketing strategies.
3. A study from Chang et al. (2009) concentrates on mining of text information which was gathered by diverse sources, such as service telephone hotline. Using this data various content analyses are conducted aiming at insights to develop strategies for marketing and CRM.

As seen in the examples, some of the classes or clusters can be used for related analysis. Berry and Linoff (2004) call this **affinity grouping or association rules** and mention the market basket analysis as key example. The defined classes or groups are basically defined to analyse,
if they have commonalities and validate them with probabilities. For instance, if customer groups buy product A it is likely, that they buy accessory C with a probability of 40%.

Within this context, **Regression** analysis can be used to map data and create correlations between them. Hence, regression methods are used to statistically estimate a future value based on an already calculated regression. Linear and logistic regressions are two common calculation tools to build such scenarios (Giraud-Carrier & Povel, 2003; Mitra et al., 2002).

**Estimations** are more precise compared to the classification or clustering. While classifications have two attributes that assign a customer to a group or not, estimations are trying to size up specific thresholds to define the customer group(s) (Berry & Linoff, 2004). As an example, estimations are used to define the age of customers who are interested to buy accessory C in Country 1 based on the sales-data from a comparable country 2 (i.e. How old is the major customer groups for swiss watches in Germany, based on the sales-out data of swiss watches in Switzerland). Within such data estimations, forecasting or predictions are very likely to be used as well.

**Forecasting** aims to predict the actual data patterns. Based on the analysis of existing data, the forecasting calculations project future values. An illustrative and simplistic example is the forecasting of seasonal turnover based on customer demand; e.g. sun protection sales is highest in august (Ahmed, 2004; Berry & Linoff, 2004). A more complex and realistic example is the forecasting of stock exchange prices. Enke and Thawornwong (2005) have researched, that neural network technologies – which will be discussed later – can support the higher profits under the same risk conditions. However, the multiple influencing factors on the stock exchange indicate the limitations of a mathematical model. Within the context of aCRM turnover forecasting, price simulation and other scenarios are possible but rarely discussed within the literate from a German B2B perspective. Moreover, it is mentioned, that forecasting is often performed as DM application even though it seems to be a predictive analytics technique, due to the fact, that forecasting tries to predict future values.

**Profiling** describes the identified classes, groups or predictions that have been analyses. Thereby it combines multiple aspects of customers into a profound explanation and may include data such as sales history, demographical details or customer satisfaction (Xu & Walton, 2005). It can be a simple statement that raises attentions such as the political message,
that women support more democrats than men (Berry & Linoff, 2004) or it can be more precise when describing Personas (i.e. stereotype customer profiles) as the typical customer from a marketing perspective for a whole organisation, that targets all their communication activities accordingly (Lemon & Verhoef, 2016). In both scenarios, the underlying data needs a description and explanation so that it can be used properly.

Lastly, visualisation is of course also a key element when it comes to DM applications. DM applications will only be successful with well visualised data, where the results can be captured quickly and management does understand the results as well as the impact in a short period of time (Shaw et al., 2001).

<table>
<thead>
<tr>
<th>Table 2-2: Overview of DM technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM technology</td>
</tr>
<tr>
<td>Clustering...</td>
</tr>
<tr>
<td>Classification...</td>
</tr>
<tr>
<td>Association rules...</td>
</tr>
<tr>
<td>Regression analysis...</td>
</tr>
<tr>
<td>Estimations</td>
</tr>
<tr>
<td>Forecasting...</td>
</tr>
<tr>
<td>Profiling...</td>
</tr>
<tr>
<td>Visualisation...</td>
</tr>
</tbody>
</table>

In conclusion, data mining has already various applications, but its importance and relevance increases, because the data availability and data amount increases. The megatrend of ‘Big Data’ creates huge opportunities for organisations to deploy DM technologies (Abbasi et al., 2016; Assunção et al., 2015). Table 2-2 concludes all these discussed technologies and gives an example for each of them. Having these technologies in mind, the question of ‘How to analyse data with DM’ has been answered and the following chapter concentrates on the business applications of DM answering the question ‘What to analyse with DM?’.
2.6.2 Main business applications within aCRM

With DM as main technology, many studies investigate CRM applications and analyse what CRM perspective is most focused. According to Xu and Walton (2005) most CRM systems are dominated by operational applications and the analytical applications are rare. Being aware of these findings, it is not a surprise that there are only limited studies that provide a solid overview of practical aCRM applications which are discussed within a business context instead of from a technical view. At the same time, some authors discuss real-time analytics and unify operational and analytical CRM and thereby clearly highlight the benefits (Acker et al., 2011). To achieve this symbiosis of analytics and operations, the applications of aCRM must be understood. Kelly (2000) incorporates all applications of aCRM into six groups. These six groups will be used to provide an overview of possibilities for aCRM business applications.

1. Sales analysis

Sales analysis includes all dimensions of sales (e.g. sold quantities, turnover) and all influencing factors of sales (e.g. competitors, purchasing power, product innovation). ACRM can support organisations by analysing these dimensions, such as sales channels, sales by region or month or by product group, and much more. However, static analyses are outdated and do not provide any competitive advantages. On the other side, dynamics analysis with only a few dependencies can already be a big differentiator. In other words, if organisations are capable to perform proper cross- and up-sell analysis that are based on a third component such as age and/or origin of the prospect/customer, they are gathering powerful insights with simple analysis technologies (Kelly, 2000). Tanner et al. (2005) contribute with their study by scrutinising the following areas in sales organisations:

- **Data**: What data can be tracked and analysed by sales people?
- **Analytical tools**: What models can be developed with that data?
- **Sales force CRM objectives**: How does CRM affect the objectives of sales people?
- **Customer valuation and segmentation**: How can aCRM improve customer value?
- **Customer relationship**: How does aCRM affect the customer relationship and the corresponding sales activities?
- **Customer-centric measures**: How can long-term sales activities be accounted for the sales people (as they have short-term targets)?
When defining sales analysis (e.g. sales performance reports or win-loss comparisons) these questions should be incorporated when designing them and to review their success. Otherwise, aCRM applications will be developed but not used and consequently have no impact on the organisation.

2. Customer profile analysis

Closely linked to the sales analysis, customer profiles can be analysed. Profiling was already discussed within the previous chapter, highlighting the concept of personas in modern marketing. For this reason, this section will be kept short giving an overview of possible customer profiles which can be analysed.

Table 2-3: Examples of customer profiling

<table>
<thead>
<tr>
<th>Customer profile by…</th>
<th>Explanatory business question / impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>… product utilisation and frequency</td>
<td>Which products are being used by which customer group and how do they use them differently?</td>
</tr>
<tr>
<td>… demographic characteristics</td>
<td>How old are my key customers? How can I differentiate marketing activities based on male &amp; female customers?</td>
</tr>
<tr>
<td>… geographic characteristics</td>
<td>Where are my key customers coming from?</td>
</tr>
<tr>
<td>… psychographic characteristics</td>
<td>Do my customers care about the environment or politics? How can I combine values (e.g. religion) with my product advertisement?</td>
</tr>
<tr>
<td>… purchase channel usage</td>
<td>Where do my customer prefer to buy (online, offline)?</td>
</tr>
<tr>
<td>… preferred communication channel</td>
<td>What is the preferred communication channel in pre- and after sales and how can I manage them efficiently?</td>
</tr>
</tbody>
</table>

Customer profiles can be built with different purposes. While some profiles can be kept relatively static (e.g. geographic) others must be revised frequently, as these profiles may vary with any customer purchase (e.g. purchase channel). All these examples aim to distinguish the mass of customers and manage them through their life cycle. In other words, with precise information in marketing and pre-sales, through the right communication channels during sales and with the right solutions in after-sales (Kelly, 2000; Rathi et al., 2010; Xu & Walton, 2005).

3. Campaign analysis

Based on the defined customer profiles, organisation build customer groups to provide them with marketing material within campaigns. These campaigns can be designed, conducted and sent out via CRM and therefore they are a potential element to be analysed. Most of these campaigns are allocated to the marketing processes within the CRM perspectives and until the
turn of the millennium there was nearly no analytical attention to this area. Today, with capabilities of modern technology and the presence of social media this has changed, and organisations can analyse campaigns in various ways. Most commonly, the basic analysis covers the opening rate and response rate of a campaign (Chablo, 2001; Guido et al., 2011). By this organisation can see what attention and interest could be drawn from the campaign. Furthermore, it is possible to analyse received leads and related turnover which indicates the return on (campaign) investment (Peter & Roland, 1996). However, there are discussions between marketing and sales departments arguing to which extend campaigns are affecting the actual sales. With that said, it can be summarised that the key campaign analyses are: (1) Opening rate of the campaign, (2) response rate of the campaign, (3) generated leads by campaign and (4) generated turnover by campaign. Obviously, there are much more KPIs for other applications, but those four are most important in this context (Burkhard, 2006; d’Astous et al., 2003; Hohenschwert & Geiger, 2015; Verbeke et al., 2011).

4. **Loyalty analysis**

While the campaign analysis looks after the first step within the CRM process (i.e. marketing) the loyalty analysis is focused on keeping customers happy and thereby reduce the customer churn rate to its lowest. Obviously, the key target of any CRM initiative should be to maximise the wealth of the customer relationship. Therefore, many indicators are available to analyse, such as repetitive purchases by client, sales per season, the range of products and services per client, and much more (Kelly, 2000). Even though(practically), this is not often the case many studies are focusing nowadays on the prediction of the customer churn rate (Ahn et al., 2006; Bahnsen et al., 2015; Farquad et al., 2014; Gür Ali & Artürek, 2014). Thereby large data sets must be analysed and with the help of modern technologies insights can be gathered how the customer churn rate can be reduced. In this context, Farquad et al. (2014) has built customer groups based on CRM data and identified what differences have an impact on customer churn rate using data mining.

5. **Customer contact analysis**

As the customer relationship should be focused primarily when implementing CRM, customer contact (activities) should be as well. Fortunately, many organisations focus at least on the interaction between their sales people and clients. Hence, it makes sense to incorporate these
activities into analytical practices (Tanner et al., 2005). Basic activities such as phone calls, visits and customer complaints are tracked by organisations either from an internal efficiency perspective or from an external customer perspective. Thereby organisations are either interested in how fast the customer has been served or in the most time-consuming activities from an efficiency perspective (Kelly, 2000). D. S. Johnson (2005) states, that the digitalisation of these internal and external sales activities will increase and that there is a direct correlation between the digitalisation of sales activities and the sales efficiency. In other words, the more digitalised the sales activities become, the more efficient sales people will be. Hence, it seems logical to incorporate sales and other customer contact activities into aCRM. Moreover, these activities have an influence on the profitability analysis which is considered to be another aCRM application (Smith & Dikolli, 1995).

6. **Profitability analysis**

Any CRM software has financially relevant indicators in their database. Obviously, sales and turnover figures indicate the income and thereby CRM plays a key role. Less obviously, sales activities or complaints could be incorporated as hidden effort drivers and therefore may be relevant on the cost side. Drilling it down to a specific application, it is essential to define if the profitability of a complete customer group shall be measured or for single customers. According to Kelly (2000) it is also possible to differentiate between sales channels or product types and thereby determine pricing and discounts to maximise market penetration by minimal margins. Overall, customer profitability has become well-researched and many studies recommend different models to analyse it (e.g. Florez-Lopez & Ramon-Jeronimo, 2009; Smith & Dikolli, 1995; van Raaij, 2005). Thereby customer lifetime value calculations are one of the leading concepts whereby organisations try to determine the value of customers for the organisation using this indicator for customer segmentation (Ekinci et al., 2014; Jain & Singh, 2002; Pfeifer et al., 2005). As opposite to this, the customer value concepts try to identify the value of the organisations (and its products and services) for the actual customers which is rather an external view (Eggert & Ulaga, 2002; Lam et al., 2004). As there are many aspects to analyse profitability, it will not be discussed further at this point. However, it is important to understand, that profitability of customers is a key application for CRM, but it is often not
deployed within the actual software. Instead, these analyses are performed outside of CRM even though they are based on CRM data.

Finally, all of these discussed aCRM applications are enhancing the customer knowledge, which enables organisation to improve their insights about potential customers, customer segments and individual customers as well as about the knowledge possessed by customers (Rowley, 2002). After having elaborated CRM and its analytical elements from today’s perspective, the next sections discuss analytics from a predictive and future perspective for German B2B organisations.

2.6.3 Introduction of Predictive analytics

Predictive Analytics is a part of data mining where – based on the meaningful patterns – analyses are being conducted to predict the possibility of a specific event (i.e. Customer requests a quote or order directly). The list of predictive analysis applications is already long. For instances, organizations are using such models to identify people who don’t pay their taxes, calculating probabilities of heart strokes or calculating how likely a customer can’t pay invoices (Finlay, 2014; Kotu & Deshpande, 2014). However, reviewing the literature profound studies covering the combination of CRM and predictive analytics in the B2B context are limited. The following paragraphs give an overview about the key existing articles, that exist in this area as first overview.

The study from Bruce and Maguire (2015) discusses the association between data management and customer centric marketing. According to the conducted survey most of the organisations have identified the need, urgency and potential benefits of data driven marketing. The study summarises that organisations are collecting data and trying to extract valuable information from increasing customer touchpoints. This situation is being managed with specific data management software, combining business intelligence approaches with established CRM solutions. The survey has shown, that data silos and data parsing are the key challenge to be resolve. Having this in mind automated marketing campaigns, processes and workflows have been identified as major benefits. To achieve these the study gives some strategy recommendations such as talent management as well as interdisciplinary collaboration to extract insights from the gathered data. The study recommends tailoring customer messages in the digital world specifically to the customer group with fast response time and thereby
considering that talent management is more important than the actual technology and tools. Critically reviewing, this study describes data driven marketing from an internal brand perspective but does not give any insights about the outside customer perspective. Furthermore, they discuss marketing campaigns but neglect other marketing parts such as lead management concept to invest resources at the right time and the right place. Even though driving sales was considered as key benefit the interface between marketing and sales is not focused. From a methodology perspective only senior executives from huge companies in diverse industries have been surveyed. Hence no actionable recommendations for medium sized companies could be given.

Barkin (2011) discusses why CRM and PA should be combined. Thereby he highlights that the combination of CRM and PA aims to achieve higher customer retention and increases ROI. To achieve this, two aspects are scratched. Firstly, the calculation of the likelihood of events is discussed. If organisations are able to predict precisely if and when a customer might change to the competitor, corrective actions can be implemented individually for each customer. The second aspect is the integration of social media. Customer behaviour on social media can be analysed and used for market research and to calculate the above-mentioned likelihood of events. The whole article outlines the potential of PA and CRM based on a few expert meanings. It does not focus on specific industries or companies and no data is available as evidence. However, the potential is illustrated clearly with examples for the professional (but not academic) CRM community.

The leading CRM software provider Salesforce forecasts that PA will lead to 77% higher sales than from top performing sales people. Hence the importance on how PA can boost CRM systems is dependent from some factors which were published by Smith (2016). Firstly, predictive analytics should not solely rely on past data but also incorporates present and future information. Secondly, PA should be used to improve customer relations within human interactions. Thus, the delivered insights from PA must be recognised and pro-actively used by sales people when talking to the customer. Thirdly, the Marketing ROI can be maximised when using PA by sending marketing campaigns to the (from the PA tool) suggested customers at the right time. Fourthly, time and resources should be allocated to PA so that data-driven decisions can be prepared and made. Fifthly and lastly PA should be further
developed with Business Intelligence algorithms and rules. Without enhancing the PA tool, it will not improve the predictions because they are based on one status of data only. Even though this article is already more profound and described in a better technical way the focus is still not clear enough. No specific industry is focused and no clear guidance is given for practice to approach the development of CRM and PA.

A much more technical paper was published by Rathi et al. (2010). They have developed a model which can predict the trend of customers buying a computer based on age and gender. Therefore, a database was set up and analysed with the help of algorithms. These formulas were described in detail from a technical perspective. On the other hand, the output of the model was not clear for sales and marketing academics or professionals. In addition, it was not clear whether this formula was successful for organisations and which impact it could deliver. Language errors and a general shortage of the article made it hard to read and understand. Another technical model from Łapczyński and Jefmański (2014) which elaborates the quality of predictive models in CRM could be found but will not be reviewed in detail for the same reasons.

### 2.6.4 Key technologies to apply Predictive Analytics

Looking at the literature from a technology perspective, some technologies are introduced. Those articles are published in technical papers where attention from practitioners and marketers is missing. Only the evolution and the data availability (i.e. structured-, unstructured web data, mobile and sensor data) is presented in a way that is easy to understand for practitioners and can be used as basis for the evaluation of predictive analytics. However, there is no guidance on what to do with this data and how to implement the technologies that are explained in technical detail. The technologies which are explained are segmentation approaches, data mining as part of machine learning, classification trees, regressions and algorithms of any kind as well as some specific PA models which are tested for specific scenarios (Bradlow et al., 2017; Chen et al., 2012; Mishra & Silakari, 2012).
To receive a rough classification and overview of possible PA technologies, the illustration has identified the most common technologies and ranked them according to complexity and accuracy. Following this logic, every technology will be shortly introduced with its key characteristics. Thereby the focus is clearly set on the procedure of the technology but not on any of the applications. Obviously, there is a slight overlap of the main PA technologies in this section and the introduced DM technologies. While DM applications aim to analyse data, only some of them (which are mentioned in this chapter) target to predict values. Consequently, PA technologies are a particularised subset of the above-mentioned DM technologies.

The **RFM application** predicts future purchases bases on purchasing period (R), purchasing frequency (F) and purchasing amount (M). Thereby max. 125 groups (5*5*5) are suggested (Krishna & Ravi, 2016; Olson & Chae, 2012). Those 125 groups can be targeted individually which is already complex from a marketing standpoint. However, the calculation itself is obviously easy but at the same time the prediction is quite unprecise since it calculates the groups based on only three parameters at one specific point in time(Dursun & Caber, 2016; Miglautsch, 2002).

The usage of **decision trees** seems to be easier when applying it to simple scenarios. However, as these decision trees can be used to predict multiple-dimension analysis it is more complex
than the RFM model. In general, a decision tree adds up the probabilities of each dimension and therefore gives a concrete indication about the probability that a customer follows this path (Newendorp, 1976; Thomas & Galambos, 2004). By incorporating several dimensions, the accuracy increases even though the decision tree remains a one-point-in-time analysis and must be redone regularly to derive actions in marketing and sales (Albadvi et al., 2009; Krishna & Ravi, 2016).

As regression models are statistically approved techniques, the accuracy is higher and can be measured. At the same time regression models are reliable on big data sets to achieve a specific accuracy in the prediction. Regression models can be differentiated as seen in chapter 2.6.1 into linear and logistic regressions. Moreover, the regression can be focused on past data only and can be used to predict future values (Cameron & Trivedi, 2013; Draper & Smith, 2014). Consequently, the complexity increases and regression models may not be developed and calculated from practitioners, especially when multiple dimensions should be integrated (Baecke & van den Poel, 2013; Krishna & Ravi, 2016). In general, regression models aim to find statistically relevant correlations between two or multiple variables. Consequently, those models are presenting their results in an explanatory way.

The latent semantic indexing (LSI) identifies textual concepts on websites and correlates them to customer data, i.e. customers who offer ‘heating services’ on their website may purchase gas analyser. As the scanning process of this technique is quite complex it can only be executed with the support of specific software and with trained employees. This makes it more difficult to apply but gives a very solid prediction on the website context that can be used for target marketing (Deerwester et al., 1990; Hofmann, 2017; Thorleuchter et al., 2012). In the context of SMEs, studies also suggest generating more traffic on their website which leads to greater popularity of their brand and reaches more prospects (Quinton Sarah & Khan Mohammed Ali, 2009).

Lastly, neural networks have been mentioned in the literature but only limited applications could be found (Guido et al., 2011). Neural networks are operating like a black box, where the algorithm is being trained by an expert until it is intelligent enough to predict the results independently (Haykin, 1994). For instance, such an algorithm could scan hundreds of portraits of cats and dogs. After the teaching phase, the algorithm can judge by itself if the
portray illustrates a cat or a dog. Even though a very high prediction can be achieved by full automatization, the complexity is probably too high to incorporate it in most of the German B2B organisations.

2.6.5 Specific applications and models of Predictive Analytics

After having introduced key contributions of PA and its key technologies, the following section provides an overview of specific applications and models of PA.

Within the CRM field the articles from Krishna and Ravi (2016) and Davenport (2013) has given a solid overview of applications for PA. Davenport (2013) sees applications of PA specifically in the area of customer retention reducing churn rates and to analyse customers and markets for targeted classification and communication. Krishna and Ravi (2016) add to the classification approaches, that predictive analytics should be applied in the following areas:

- **Customer Lifetime classification** to detect possible customer churns.
- **Sentiment analysis** to detect specific text parts, which can be used to derive customer emotions posted on social media and consequently target the individual marketing activities.
- **Customer profiling** based on credit scoring to identify possible fraud risks.
- **Market basket analysis** to cross sell products to existing customers.

Mishra and Silakari (2012) provide a more generic overview of PA applications, where they mention that it can be beneficial for multiple areas. They partly support the applications mentioned above, but without discussing them in depth. In addition, Chen et al. (2012) provide a similar overview for analytic applications for BI and analytics in general, without focusing on predictive analytics. The most compelling overview is provided by Mirzaei and Iyer (2014). Within their article, they analyse existing literature and map PA technologies to CRM dimensions and areas. Without looking at every technology the major CRM elements are separated into five areas along the customer lifetime:
1. **Customer acquisition**: PA can be used to target and segment customers.

2. **Customer attraction**: PA can mainly be used for direct marketing.

3. **Customer retention**: PA can be used to enhance loyalty, manage complaints and reduce customer churn.

4. **Customer development phase**: PA can identify market baskets and improve up- and cross selling

5. **Customer Equity Growth**: PA can identify customer profitability and CLV.

Even if these findings are well organised along the CRM process, they do not provide great details in how to apply PA to achieve – for instance – a better loyalty. Other authors are focusing more on these specific implementations and thereby provide tangible insights for concrete fields or areas.

Within the **field of Digital Marketing** the study from Thorleuchter et al. (2012) discusses in detail how predictive analytics - based on text mining - can be used to identify possible new customers. In particular, the study explains how websites of potential customers can be scanned and compared to existing customer’s websites with the target to explanatorily use the output of the predictive analysis. Based on these findings new potential customers can be targeted individually with a higher probability of becoming a buying customer. Furthermore, the same principle can be applied to predict the profitability of potential customers. Secondly, the text analysis of social media posts was mentioned by Phillips-Wren and Hoskisson (2015) as key application with the target to predict emotions, queries or even complaints from existing customers. Additionally, the availability of geo data from mobile devices can be used to enrich such digital marketing applications to cluster the results according to regions (Bradlow et al., 2017).

In the **field of operational selling** applications the study of Baecke and van den Poel (2013) investigates, if predictive analytics can foresee a higher potential in a specific sales region based on the historical sales development. Stating that the existing cars in the neighbourhood influence the buying decision of customers who want to buy a new car, they draw the conclusion that specific areas have more potential than others. Another study in the field of retailing has examined the price elasticity by analysing the sales of a specific store and then applying the same pricing to all comparable stores. Beneficially the results showed that they
could sell at the best possible price with high quantities and thereby maximise their margin (Bradlow et al., 2017). Both applications, as well as the market basket analysis from above, can be classified as strategic sales analysis to guide sales operations.

In the field of **B2B sales predictions**, machine learning helps to identify weak sales areas and provide explanations. Thereby, B2B experts generate data sets which are used as input for predictive models such as classification trees or regressions. Based on those predictions an explanation is generated, which basically observes how the output changes when the hidden input factors are being changed. If the output factor changes dramatically the input factors seem to be relevant for the model. Those newly generated outputs result in new insights which are being used to improve the original data set of the PA model. By using this model for a specific business scenario (weak sales performance in one segment) the authors prove that sales predictions can be an effective support for B2B sales due to better internal knowledge and communication of the team. To do so the authors suggest to identify the most relevant attributes of data to select the best-performing machine learning model and use the explanations to generate insights (Bohanec et al., 2016).

Lastly, within the **field of prospect identification** Rathi et al. (2010) have developed of a model which can predict the trend of customers buying a computer based on age and gender. Therefore, a database was set up and analysed with the help of algorithms. Afterwards customers can be selected and approached before building a relationship with those selected customers. Those formulas were described in detail from a technical perspective.
## Table 2-4: PA applications and their benefits

<table>
<thead>
<tr>
<th>PA application</th>
<th>Benefits for organisations</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify customer retention</td>
<td>Identify customers which may need new products and services and thereby reduce churn rates</td>
<td>(Davenport, 2013; Krishna &amp; Ravi, 2016; Mirzaei &amp; Iyer, 2014)</td>
</tr>
<tr>
<td>Analyse / Segment customers and markets</td>
<td>Provide targeted communication and direct marketing</td>
<td>(Davenport, 2013; Mirzaei &amp; Iyer, 2014)</td>
</tr>
<tr>
<td>Sentiment analysis to detect specific text parts</td>
<td>Derive customer emotions posted on social media and consequently target the individual marketing activities</td>
<td>(Krishna &amp; Ravi, 2016)</td>
</tr>
<tr>
<td>Customer profiling based on credit scoring</td>
<td>Detect possible fraud risk</td>
<td>(Krishna &amp; Ravi, 2016)</td>
</tr>
<tr>
<td>Market basket analysis</td>
<td>Offer cross- and up-selling products</td>
<td>(Krishna &amp; Ravi, 2016; Mirzaei &amp; Iyer, 2014)</td>
</tr>
<tr>
<td>Complaint and loyalty management</td>
<td>Predict complaints (e.g. for specific products) and thereby increase loyalty</td>
<td>(Mirzaei &amp; Iyer, 2014)</td>
</tr>
<tr>
<td>Identify customer profitability and CLV</td>
<td>Enhance customer profitability and identify CLV to enhance equity growth</td>
<td>(Mirzaei &amp; Iyer, 2014)</td>
</tr>
<tr>
<td>Digital marketing: Text mining of customers website</td>
<td>Identify possible new customers based on their website content</td>
<td>(Thorleuchter et al., 2012)</td>
</tr>
<tr>
<td>Operational selling and B2B sales predictions: Sales analysis</td>
<td>Analyse sales potentials or weak regions based on historical sales data and thereby introduce marketing / sales activities to the market place</td>
<td>(Baecke &amp; van den Poel, 2013; Bohanec et al., 2016)</td>
</tr>
<tr>
<td>Operational selling: Price elasticity</td>
<td>Identify best possible price with high quantities and thereby maximise margin</td>
<td>(Bradlow et al., 2017)</td>
</tr>
<tr>
<td>Prospect identification</td>
<td>Identify possible customers based on demographic data (age / gender)</td>
<td>(Rathi et al., 2010)</td>
</tr>
</tbody>
</table>

As seen in the summary above, several applications of PA are introduced in recent articles. However, these articles are not always related to CRM technology but mostly to the actual customer management. Most authors present applications from a rather technical perspective while some authors are presenting them on a very high level, trying to explain it easily for practitioners. B2B is clearly focused from most academics and some articles narrow it down to a specific industry or case study (e.g. retailing). None of the above presented applications could deliver a general statement. Furthermore, they all lack in presenting clear evidence for a whole industry or sector because they are either to generic or based on single cases, where they research narrow applications in detail.
2.7 Conclusion and the CMAT model

Until now, this chapter has discussed several concepts of CRM, mainly focusing on the analytical part. Besides the historical review and a CRM definition, the main concepts have been discussed. Thereby the strategic dimensions of CRM, the success factors for implementation and planning as well as the technical usage in general (i.e. using Data Mining) and for predictive analytics have been identified as major concepts. Moreover, and discussed in the following chapter, CRM measurement must be added as fourth concept. As these four concepts build an aCRM model for the further research, this section introduces and briefly assess leading CRM models. Afterwards the most suitable model will be used as counterpart CRM model to summarise, compare and conclude this chapter. To identify the most relevant CRM model, the comparison of Meyliana et al. (2014) has been used as basis and enriched with the researches practical experiences. As a result, six CRM models are assessed and compared in table 2-5.

Table 2-5: CRM model comparison

<table>
<thead>
<tr>
<th>CRM Model</th>
<th>Concept of the model</th>
<th>Strength</th>
<th>Weaknesses</th>
<th>Impact &amp; Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMAT</td>
<td>Questionnaire-based measurement model to assess how well an organisation manages their customer relationships across 9 dimensions (1) Analysis and planning (2) the proposition (3) information and technology (4) people and organisation, (5) processes (6) customer management activities (7) the customer experience (8) competitors (9) measuring the effect</td>
<td>+ Well recognised amongst academics and practitioners + Comprehensive and profound dimensions + Strong quantitative evidence</td>
<td>- Very similar to QCI - Complex and time consuming to apply</td>
<td>Applicable and suitable to compare the comprehensive 9 dimensions, because of its strong quantitative evidence and its recognition in practice.</td>
</tr>
<tr>
<td>IDIC</td>
<td>Model to assess the expectations of customers and their value to the business across four dimensions, namely: Identify, differentiate, interact, and customize</td>
<td>+ Strategic customer focus + Detailed focus on customer phases</td>
<td>- Missing measurement - No incorporation of technology / software</td>
<td>No applicable as comparative model, as technology is not considered at all.</td>
</tr>
<tr>
<td>QCI</td>
<td>Questionnaire-based measurement model to assess how well an organisation manages their customer relationships across 8 dimensions focusing on customers instead of processes</td>
<td>+ Comprehensive and profound dimensions + Strong quantitative evidence</td>
<td>- Very similar to CMAT - No incorporation of competitors cf. to CMAT</td>
<td>Could be used as comparison, due to its comprehensive approach with 8 dimensions.</td>
</tr>
</tbody>
</table>
In conclusion, the comparison of table 2-5 devoted that the CMAT model is best suitable as counterpart model, because of three main reasons. First, it is well recognised and accepted by practitioners and academics. Second, it is based on quantitative evidence (as this research). Third, it concludes all aspects of CRM and was already successfully applied within organisations. For these reasons, the CMAT model will be introduced and compared with the discussed CRM constructs from this study.

In practice CMAT became one of the most favourite models to apply, when organisations want to measure and compare their customer management practice. Thereby 260 questions are asked to senior management and sales staff, so that gaps between strategic and operational business processes may be identified. Based on these questions, a quartile positioning of the 31 categories (in 8 groups) will be made, so that organisations can identify their strength and weaknesses (Starkey & Woodcock, 2002). To get a better understanding of the CMAT model,
these groups and categories will be shortly and critically discussed as well as allocated to the introduced CRM concepts of the previous chapters.

Woodcock (2005) starts the assessment with the **analysis and planning** stage which focuses on understanding the value and behaviour of different customer groups and their impact on the retention, efficiency, acquisition and penetration of clients. Thereby, internal information is key to build those customer groups and plan corresponding marketing and sales activities accordingly. To do so, different analysis and planning approaches are introduced, such as the understanding of customer lifecycle, profiling or customer transaction analysis. The analysis and planning stage within CMAT include some valuable thoughts and questions to identify the standpoint of organisations. However, they may be outdated, as technology has evolved dramatically in the past years. Recent analytical applications are discussed under the umbrella of data mining and predictive analytics technology.

Based on a sound analysis and planning, the customer **proposition** should be formulated and communicated. Obviously, propositions may vary from customer group to customer group and therefore it is key to define them in detail and consider factors that influence the customer experience. The CMAT model elaborates among others customer needs, service standards and proposition communication. The proposition definition and communication may be one of the most customer-oriented elements of the CMAT model. Specifically looking at the proposition value from an organisational perspective, it is often part of marketing activities but seldomly considered within an CRM initiative or software. However, as this is a more communicative activity of sales people, software can only provide limited support (e.g. with pre-defined selling prepositions in a software). For this reason, the proposition element is not considered as being relevant for the conceptual model and the data gathering section later.

Next, the **information and technology** perspective is illustrated as base for all other CRM elements and thereby functions as enabler to gather and make use of information about customers. Besides being an enabler, IT should also be seen from a customer perspective, as clients are using technology intensively in their purchasing process. Hence, information (and) technology must be considered from an internal perspective, where organisations manage existing systems and develop new application solutions improving the use of technology, especially to manage large amount of data effectively. This internal perspective is considered
by Woodcock (2005) but the CMAT models does not consider technology as customer-centric element of a CRM initiative. Obviously, technology affects the analysis and proposition elements but also has a direct association to people and organisations.

The perspective of **people and organisation** does cover the personnel perspective. Thereby the organisational structure, role identification as well as the competency assessment and personnel development are considered. Of course, people management is key to any organisational initiative like CRM. However, looking at CRM from a functional and software-oriented perspective it can be argued that suitable people are key pre-condition to start a CRM initiative. Moreover, the personnel development is not specific to CRM implementation but a general task of any organisational development. Lastly, CRM implementation normally kicks-off with less consideration of the personnel situation but during the implementation, change management becomes strategically important to the CRM-success. Woodcock (2005) evaluates the actual situation of an organisation and its employees. This is a solid approach for an analysis stage but does not reflect the actual strategic dimensions that need to be considered when implementing CRM. In conclusion, people development, organisational alignment and change management are strategic dimensions that need to be considered within any CRM initiative and software implementation.

When technology and people come together, business **process management** becomes the connecting element, especially when standardising the formal procedure of activities and making them transparent. Within CMAT, Woodcock (2005) analyses the formal process management of an organisation as it is key for the CRM success. Looking at this from today’s perspective, this argument became even stronger as technology needs transparency to model and implement business processes. Moreover, measurements and process improvements can only be targeted, if transparency is guaranteed. Within the CRM implementation of a software, the process element is vital as success factor before starting with the implementation. The procedure of mapping processes first, before implementing them into a software becomes disrupted by agile project management methods but remains equally important, even though the implementation packages become much smaller. Finally, technology is discussed as broad and overarching component within CMAT, without focusing on a CRM system or even technology.
In addition, and probably more important, process management serves as basis for the **measurement** of CRM success and thereby it is key to consider the overall customer processes (internally and externally) when defining KPIs along the customer management. Measuring the CRM performance of organisations has multiple dimensions. CMAT looks at strategic, corporate and campaign measures as well as at the channel management and KPI along customer activities. Less attention is drawn to the actual success of the CRM implementation from a project perspective; i.e. Return-on-investment of the project costs. Even though this is hard to measure, it is also key to provide an indication of the project success evaluating what financial improvements can be generated with CRM and what investments (i.e. costs) are necessary to implement it. Moreover, the measurement should be focused on the business performance in its different elements (internal process efficiency, external customer satisfaction, organisational and financial performance).³

Woodcock (2005) also evaluates **customer management** activities within the model and applies a customer lifecycle approach looking at all activities from targeting customers until winning them back. This comprehensive approach is key to understand all internal activities of the CRM lifecycle but also to map these activities and generate insights about the customer (purchasing) phases. The CMAT model argues, that these activities aim to deliver the proposition to their customers and thereby generate a good customer experience. Even though this is a valid argument within a regular sales process, it disregards the actual customer phase (i.e. information gathering, price comparison, negotiation, etc.). For instance, it may be possible, that a customer is not interested in the actual proposition but likes to receive a formal quote as soon as possible without any sales contact. In this example, speed is crucially important within the sales activities, but the propositions do not add any value to the customer (experience).

CMAT considers the **customer experience** as the understanding and measurement of the actual customer feelings and thoughts by using satisfaction monitoring, loyalty analysis, mystery shopping etc. Instead of considering customer experience as part of the CRM model, the following chapters discuss the external customer satisfaction as outcome and thereby as indicator of business performance, that is influenced by CRM. Woodcock (2005) considers

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³ Elements of business performance are discussed separately in the next chapter.
competitors as further influencing factor on the customer experience, which is a valid argument. Nonetheless, a CRM initiative should focus on customers and competitors which need to be managed within this context, but not put into the centre of customer management activities. For instances, customer information must be transparent, so that technology and analysis can evaluate the proposition arguments of competitors and enable sales staff to conduct their argumentation in front of the customer. Looking at it from this customer-centric perspective, competitors should not be influencing the customer experience between the organisation and its customers.

Table 2-6: CRM concepts and CMAT

<table>
<thead>
<tr>
<th>CMAT concepts</th>
<th>Discussed CRM concepts</th>
<th>Explication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis and planning</td>
<td>aCRM technology</td>
<td>Analysis and planning concepts like CLTV are incorporated under the umbrella of modern analytical technology.</td>
</tr>
<tr>
<td>The proposition</td>
<td>-</td>
<td>The definition and communication of propositions is not considered within aCRM, as CRM systems can only suggest suitable propositions but sales staff has to communicate to the customer.</td>
</tr>
<tr>
<td>Information and technology</td>
<td>aCRM technology</td>
<td>The modern technology aspects are covered within the aCRM technology concept.</td>
</tr>
<tr>
<td>People and organisation</td>
<td>CRM implementation and planning</td>
<td>Relevant topics around people, organisation and processes are covered as success factors within the implementation planning.</td>
</tr>
<tr>
<td>Processes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer management activities</td>
<td>aCRM technology</td>
<td>Customer management activities are only considered from an analytical perspective; i.e. as applications such as customer profiling or sales analysis.</td>
</tr>
<tr>
<td>The customer experience</td>
<td>(business performance, i.e. external customer satisfaction)</td>
<td>The customer experience is incorporated as an element of business performance (i.e. customer satisfaction), whereby competitors are not considered as direct influence.</td>
</tr>
<tr>
<td>Competitors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring the effect</td>
<td>CRM measurement</td>
<td>The success of CRM can be measured during the implementation phase or afterwards in terms of business performance.</td>
</tr>
</tbody>
</table>

Table 2-5 summarises the elements of CMAT and maps them with the CRM concepts, which have been discussed so far and which will be incorporated into the conceptual framework. Hence, chapter 4 conceptually models these concepts in association with business performance. Before, the dimensions of business performance will be discussed in the next chapter within a CRM context.

Concluding this chapter, several concepts of CRM have been discussed. Starting with the overarching CRM Strategy, a framework has been developed to analyse or define a strategy prior to the actual implementation. Based on that, success factors for the implementation were
discussed so that organisations understand where to look at. Afterwards the analytical part of CRM was discussed in more detail. That means, that aCRM technologies (based on DM) as well as practical applications have been introduced. Equally, predictive analytics as advanced technology has discussed. Based on this, organisations get an easy overview about analytical applications and the underlying technology for their CRM implementation. Lastly, all concepts have been compared with the CMAT model. The next chapter discusses relevant business performance measurement aspects.
3. Chapter - Business Performance Measurements and CRM

3.1 Introduction

The previous chapter has discussed CRM along several dimensions, such as strategy, success factors for implementation and adoption. Moreover, the analytical part of CRM discussed data mining, aCRM applications as well as predictive analytics techniques. This chapter will focus on the measurement of business performance while considering the discussed CRM topics.

Business performance (BP) is discussed since decades and thereby multiple perspectives are taken into consideration. Venkatraman and Ramanujam (1986) discuss very early the aspect of financial and operational business performance. Business performance thereby is considered to be the combination of operational and financial performance which leads to organisational effectiveness. Considering the investigated organisations and their characteristics is equally important. For instances, a well-cited study from Anderson and Reeb (2003) shows, that family-owned businesses perform better than others in the US, while Maury (2006) provide comparable results for western Europe. Both studies do not specifically relate to German B2B organisations nor do they include the effect of CRM. Therefore, they will be discussed in section 3.8 so that the organisational characteristics (size and ownership) are reflected within the literature review of this chapter. In addition to the organisational characteristics, the success of companies relies a lot on their ability to operate with CRM systems successfully (Chang et al., 2010). Hence this chapter will first define business performance measurement and the main aspects of it in the context of CRM. Afterwards direct effects and indirect effects are elaborated. Lastly, measurements and scorecards will be discussed in the context of CRM and section 3.8 concludes this chapter by discussing how the literature assesses the impact of CRM on BP for different organisations, i.e. family-owned, large and SME organisations.

3.2 Definition and aspects of business performance

This section defines and structure the dimensions of business performance for the whole chapter. Business performance is discussed widely from a generic perspective as well as from a CRM specific standpoint. Even though the terminology varies between organisational and business performance, the majority of articles relates business performance to profitability.
Profitability (or financial performance) illustrates the bottom line of any organisational performance during a specific period of time. However, it can be affected by many variables such as acquisitions or dispositions. Besides such major influencing factors, organisations have three theoretical levers to improve profitability (Artikis, 2009). First, they try to improve their efficiency and thereby focus on lean processes so that a higher outcome is achieved with equal (or less) resources (Bhasin, 2015). Second, they can try to reduce costs by lowering their resources and at the same time they try to achieve equal turnover. Third, a combination is possible to maximise the profits. To measure this, organisations can focus on the following two perspectives of business performance as subset of the overall profitability:

1. The internal process efficiency (i.e. lead time) defines the performance of teams or departments. If the performance of a department improves, their lead time decreases, quality improves or costs reduce, so that their outcome increases. Due to the increasing competition in a global market place, organisations are investing more effort in these process enhancements (Gazova et al., 2016). Hence, studies are investing those attempts in organisations and state that organisations gain capabilities, if they invest in process efficiency, which can be used to be innovative and deliver relevant output for customers in the market place (Prom, 2003; Weske, 2012).

2. The external perceived value of products and services defines the customer satisfaction. Multiple studies confirm, that customer satisfaction plays a vital role for positive business performance in terms of long-term stock returns (e.g. Sorescu & Sorescu, 2016). Moreover, market share and profitability (Anderson et al., 1994) as well as on customer retention (Hennig-Thurau & Klee, 1997) are affected positively. Furthermore, customer satisfaction can reduce complaints (which minimises costs for warranties, field service, etc.) and positively influences customer loyalty, which again increases the usage level of products and thereby secures future revenues as well as reduces the danger of customer defection (Anderson et al., 1994; Bolton et al., 2004). Hence, most academics incorporate this customer perspective as measurement of business performance which is key for the external market perspective of any business performance (Bolton et al.,
2004; Reinartz et al., 2004). Focusing on the customer perspective, CRM is key to improve business performance (i.e. profitability) and it can influence these aspects directly and indirectly. Direct effects (which will be discussed in chapter 3.3) can be linked to the above discussed dimensions of internal efficiency, external customer satisfaction and financial performance to increase profitability. Indirect effects are difficult to measure as their impact on business performance is hidden by a mediating element (see chapter 3.4). The performance measurement of CRM on BP itself can be divided into two parts. The ROI calculation focuses on the software implementation side (i.e. cost-benefit comparison) and is short-term oriented. Scorecards enable organisations to build a long-term performance measurement, especially after the implementation of the CRM software.

**Figure 3—1: Effects of CRM on Business Performance**

In summary, the working definition of business performance for this study is defined as follows and illustrated above in figure 3-1:

*Business performance describes the actual effectiveness of an organisation and the impact on its financial performance (i.e. profitability). Financial performance can be increased by enhancing the internal efficiency and external customer satisfaction. CRM has direct and indirect effects on business performance. ROI calculations and scorecards can measure these effects and thereby they influence business performance of an organisation that has implemented CRM.*

The next section starts with the directs effects of CRM on business performance and discusses their impact on internal process efficiency, external customer satisfaction and finally the financial performance.
3.3 Direct effect of CRM on business performance

Mostly, CRM initiatives and implementations are confronted with the question, what effect these projects deliver. For this reason, many authors discuss the impact of CRM on the business performance and most (but not all) of them agree, that CRM has an effect on business performance (e.g. Hendricks et al., 2007; Reinartz et al., 2004; Schilke et al., 2009). Even though many studies provide evidence that CRM affects business performance positively, there are some doubt especially when measuring the direct effects of CRM on BP. To date, there are limitations in the research, weather CRM influences BP directly, since most studies incorporate mediating elements. Thus, this section investigates studies that analyse the direct effects of CRM on BP in the three defined areas of internal efficiency, external customer satisfaction and financial performance, i.e. profitability:

1. Internal efficiency

Starting with the study from Josiassen et al. (2014) a first evidence is provided that CRM implementations have a positive effect on the efficiency of organisations. In this case they measure the technical efficiency (i.e. turnover compared to number of employees and total costs) of hotels. However, they also highlight, that it is not only about the implementation and adoption of newest technology. Much more, organisations have to develop the necessary capabilities while implementing CRM to achieve the targeted benefits. Li and Mao (2012) contribute with an interview study, that CRM also has a positive effect on the performance management of sales people due to better sales activity controlling, enhance knowledge management, better customer master data, etc. For instances, SME automotive suppliers shall built up their own knowledge management, because information itself is not scarce but badly organised, which risks today’s competitive advantages of these firms (Miller et al., 2016). Hence, these studies contribute to the internal perspective illustrating that CRM is not only for customer purpose but also for the internal task and control management especially for sales staff. Similarly, the sales process effectiveness (i.e. close deals faster) and the sales professional’s ability to collaborate internally are associated with CRM utilisation and a positive correlation could be verified. A better collaboration also affects the customer performance, which can be defined as ability of sales people to understand clients and provide tailored solutions. However, there is no correlation between collaboration and sales process
effectiveness (Michael Rodriguez & Honeycutt, 2011). Looking at the efficiency from a marketing perspective, O’Sullivan and Abela (2007) add activities and the measurement of them as a new point of view. According to their study, organisations with a strong ability to monitor marketing activities, which is an internal process efficiency measurement, perform better. Thereby, it is assumed that a CRM system supports the monitoring and measurement of these marketing activities from an IT perspective. Moreover, the CEO satisfaction is also directly influenced, whereby dashboards aid to make activities transparent and reduce explanatory communication from the marketing department to the C-level. Lastly, and from a process standpoint, the degree of CRM process implementation (especially after the implementation) optimizes the economic performance of organisations. In other words, the more processes are implemented in and supported by CRM the higher the overall business performance (Reinartz et al., 2004). Besides the internal efficiency aspects, the external customer satisfaction is key to measure BP.

2. External customer satisfaction

Evaluating internal and external improvements, a framework or scorecard can help organisations and will be discussed later in this chapter. While establishing a model for the evaluation of CRM effectiveness, Kim et al. (2003) draft a cause-effect relationship and thereby state, that through an improved customer knowledge and interaction (as major CRM tasks) customer value and satisfaction does increase. In detail, CRM supports the capturing of customer information and thereby profiles and segments customers to increase the knowledge about customers. Based on that specific marketing and sales activities, customer care programmes and integrated channel management increase the value for customers and thereby ensures higher loyalty of existing customers and improved customer acquisition. Finally, customer revenues and organisational profits increase. Mithas et al. (2005) provide evidence, that there is a positive and direct association between CRM applications and customer satisfaction. They argue, that CRM applications support organisations with (1) customised offerings and more professional information providing, (2) faster processing of quotes and orders as well as (3) the enhanced capabilities to manage relationships systematically with IT support. Moreover, they discuss the mediating role of customer knowledge. For this direct association, they prove that the usage of CRM applications supports
organisations managing their relationships with customers across different customer process phases (Reinartz et al., 2004). Consequently, customer satisfaction and loyalty increase which enhances BP. Further support is provided by (Long et al., 2013) as they report a significant influence from CRM on customer satisfaction, as well as on customer loyalty. Thereby, the behaviour of employees as well as the relationship development with clients are the key drivers to achieve higher customer satisfaction.

Looking at CRM adoption from a holistic perspective, operational CRM has a positive effect on customer satisfaction. Thereby the aspects of order handling, complaint management, Pre/Post Sales integration and Marketing processes are important to consider. As a result, the increased customer satisfaction is related to an improved organisational marketing performance (i.e. internal efficiency), but the financial impact could not be verified (Zeynep Ata & Toker, 2012). Lastly, a study from Michael Rodriguez and Honeycutt (2011) confirms that there is a positive correlation between CRM utilisation and the performance with customers (i.e. sales professionals develop relationships with customers based on their needs for a solution). This positive affect on customer enhances sales performance and consequently has a positive impact on the overall BP.

3. Financial performance: Revenues, margins and profits

Certainly, all identified impacts (internal efficiency and external customer satisfaction) have an (indirect) influence on revenues, margins and profits. This section highlights the particular (and mostly direct) effects from studies to clarify their impacts on BP. Therefore, Coltman et al. (2011) contribute with their study which points out, that IT effort as standalone influencing factor does not have any statistically impact on a superior CRM capability but it is a clear indicator for business performance, i.e. the better your CRM programme the more successful your organisation. Krasnikov et al. (2009) investigate intensively the effects of CRM on profit and cost efficiency. Thereby they confirm, that CRM has a positive effect on profit efficiency (i.e. how close a company can generate maximum profits), which is also supported, if the company focuses on CRM strategically. Moreover, the effect is stronger in companies that adopt CRM earlier and the effect increases over time. In contrast, they report equal results for the reduction of cost efficiency (i.e. how well an organisation uses resources to produce a given output) with the only exception, that strategy does lower the decrease of cost efficiency. Rapp
et al. (2010) evaluate some effects around customer linking capabilities and thereby state, that the performance of CRM has a direct effect on the organisational performance.

**Figure 3—2: Direct effects of CRM on BP**

Finally, the illustration comprehends the discussed CRM benefits and their direct effects on business performance. All discussed direct effects are grouped according to their impact on BP. With that said, figure 3-2 shows which CRM benefits have an impact on internal efficiency, customer satisfaction and financial performance. In conclusion it can be stated, that CRM has many direct effects on business performance covering these three dimensions. A more detailed table of all direct effects is provided in appendix 2. The next section examines it the indirect (i.e. mediating) effects of BP on CRM.
3.4 Indirect effects of CRM on business performance

The previous section discussed the direct effects of CRM on internal efficiency, external customer satisfaction and financial indicators. The following section observes all mediating elements that have an impact on these direct effects and thereby affect the impact of CRM on business performance as well. As these mediating elements impact all three effects of BP (internal efficiency, external customer satisfaction and financial performance) a disjunction between these is not applied in this section.

The study of Reinartz et al. (2004) focuses on two mediating roles that have an influence on the association between the different CRM processes and economic performance. First, the authors identify, that a CRM-compatible organisation influences the initiation and termination stage strongly, i.e. if an organisation is able to adjust strongly to the market, they perform better when building up a customer relationship (e.g. marketing activities) and when managing the termination stage after they have purchased (e.g. customer service). However, this mediating element has no influence on the actual maintenance stage. Secondly, the study identifies CRM technology as a moderator for the termination stage but not for the maintenance and initiate phase. Hence, they argue, that technology influences the association to BP only when organisations try to retain customers. As a practical example, it can be extrapolated that organisations invest a lot of resources and manual activities in this stage and modern technology is barely used.

Chang et al. (2010) research the organisational perspective from a marketing perspective and add to this discussion. Thereby, they assert that a firms marketing capability influence the relationship between the CRM technology usage and the BP. With that said, they confirm with their hypotheses testing, that organisations with a strong marketing strategy and activity mix can perform better while using CRM technology.

Similar to the perspective of marketing capabilities, Rapp et al. (2010) discuss customer-linking capabilities which include the ability identifying customer needs and developing appropriate relationships with them. As a result, the study confirms the influence of customer-linking capabilities on CRM performance but not on organisational performance. Hence, it can be concluded that the impact is mediated by the CRM performance and thereby associates to organisational performance indirectly. Additionally, the study observes environmental
dynamism, which describes the market circumstances of an organisation. Assuming that organisations require the ability to react fast on market circumstances and changes in a dynamic environment, they also need greater customer linking capabilities to perform well. Based on this assumption the study investigates the impact of stable or dynamic environment on the association between customer linking capabilities and performance. In conclusion, the study confirms an impact of the environmental dynamism on the business performance but not on the CRM performance, which means that customer-linking capabilities are key in dynamic business environments. Zeynep Ata and Toker (2012) endorse this mediating element and confirm in their study. Overall, their study confirms that the higher the CRM adoption (across multiple dimensions) the higher the customer satisfaction and the better the organisational performance from a marketing and financial perspective. Thereby, they investigate the influence of the environmental dynamism and competition. As a result, they prove that the higher the competition or environmental dynamism the higher the negative effect on the customer satisfaction and organisational performance.

So far, the mediating elements have focused on the organisational performance overall. Hennig-Thurau and Klee (1997) are discussing the relationship quality as mediating element for customer satisfaction. Thereby they state, that the correlation between customer satisfaction and customer retention is affected by the quality of the relationship. Mithas et al. (2005) support this argumentation with their study as they point out the importance of customer knowledge as moderator. According to their study, customer knowledge influences the association between the technical CRM application and the customer satisfaction. In other words, the CRM application can only be as powerful as the available and accessible knowledge about clients, which can be managed within the application.

Schilke et al. (2009) discuss a slightly different approach since they incorporate differentiation and cost leadership from a strategy perspective as mediating element between CRM and BP. Differentiation, as the characteristic of being unique compared to competitors in the marketplace, shows to have an impact on business performances because organisation with a high differentiation are focusing on price segmentation (mostly in the high-priced sector), targeted distribution channels or on distinctive branding. Equally, cost leadership mediates the relationship between CRM and BP because organisation with a high cost leadership focus
on process improvements, operating efficiency and economy of scales. Lastly, those effects are stronger, for organisations that operate in industry where the commoditization is high.

Adding to the strategic perspective and based on an existing integrated model that combines the resource-based view and the competitive strategy, the influence of IT on business performance is investigated by Rivard et al. (2006). Their model states that firm assets have an influence on the strategy and the strategy has a correlation to the focused industry of an organisation. All three elements (firm assets, strategy and industry focus) do influence the market performance of an organisation and thereby its profitability. This logic is applied to information technology whereby the strategy and firm assets are considered from an IT perspective only. From a competitive strategy perspective, the overall business strategy affects the IT strategy and from a resource-based perspective, the overall organisational infrastructure and processes affect the infrastructure and processes. In summary, IT support for firm assets and strategy as well as the industry forces can be considered to be mediating elements on BP (i.e. market performance and profitability).

Figure 3—3: Mediating elements on business performance

Figure 3-3 illustrates the discussed indirect effects between CRM and BP. Hereby, it is demonstrated, that many mediating elements influence the effects from CRM on BP, as it can be considered as multi-dimensional phenomena. For instances, competitive dynamism might overrule all direct effects from CRM on BP, if two major competitors merge or if a monopolist dominates the market. The next section gives a summary of the performance measurement
possibilities of CRM and BP and first focuses on the actual success measurement of the CRM implementation by calculating an ROI. Afterwards, the consecutive section gives a brief overview on the actual measurement of BP after the implementation by using scorecards.

3.5 Short-term measurement of CRM implementation success via ROI

The measurement of CRM success is widely discussed within the literature. Thereby two concepts are disorganised occasionally. The Return on Investment (ROI) measurement of the actual CRM implementation project describes the cost–benefit comparison of the actual software implementation including process analysis, training and all other associated activates within the project. This section covers this short-term and project-oriented success measurement while chapter 3.6 discusses the measurement of CRM on the overall business performance. Hereby a long-term and holistic business perspective is taken into consideration because it includes not only a project related cost–benefit comparison but also an assessment on business processes, customer satisfaction and other elements such as brand awareness or innovative strength. Examining the ROI discussions on CRM software implementation the literature provides two distinctions. First, the success of any CRM implementation can be measured externally. Thereby customer satisfaction is the ultimate indicator. For instance, the response time and quality of responses to customer inquiries might be improved due to a single data source, which increases customer satisfaction. Second, the literature suggests measuring the internal process efficiency as key indicator of the CRM success. For instance, the implementation of a CRM system could automatize follow-up activities and thereby shorten the process time. This section elaborates both aspects. From an external perspective, Winer (2001) suggests three possibilities to measure the success of CRM.

1. Financially, CRM implementations aim to increase the outcome of the actual customer process. In doing so, financial KPIs such as profit margins per customer can be a good indicators for success (Krasnikov et al., 2009). Organisations must bear in mind, that ultimate indicators such as profit margins are never monocular, which makes it difficult to distribute the financial improvements. Consequently, organisation must try to make clear, which of the financial results are derived primarily from the CRM implementation. Some indicators combine the financial perspective with the market perspective (e.g. increase in turnover).
2. A successful CRM usage results in positive effects in the marketplace. By this, the increase of sold quantities or the acquisition of more customers are valid indicators to measure the success. Again, those indicators are not only influenced by the CRM system. However, if most of the other influencing parameters are equal, the effect of CRM can be indicated successfully.

3. Purely customer centric measures focus on the effect of individual customers, instead of the whole marketplace. Even though there is a specific overlap, it makes sense to analyse the whole marketplace and single customer (groups) to identify whether specific customer groups are affected differently by the usage of the CRM system (Chen & Popovich, 2003; Winer, 2001). In addition, there is another aspect of measuring the effects on the long-term relationship, which include three aspects. This triangle covers quality, productivity and profitability of the customer relationship and contributes to the long-term measurement of customer relationships and therefore aims to evaluate business performance and not ROI. However, the triangle provides some further indicators that can be used to measure the external success (e.g. customer retention up, share of customers up, brand equity up, etc.) (Gummesson & Gunnesson, 2004). Many other authors confirm this external perspective, which is important to assess the CRM success from market customer side (Buttle, 2004; Kim et al., 2003; Mckim & Hughes, 2000; Mithas et al., 2005).

After having scratched the external benefits of a CRM implementation, the internal perspective needs attention as well. Organisations aim for internal improvements more often in the beginning of CRM implementations, because they have identified inefficient processes and want to eliminate them with a CRM software. To do so, Bohling et al. (2006) suggest to define suitable business cases and equip them with corresponding metrics. Afterwards the organisation should measure the benefits long- and short-term and assess them against the occurred costs of the implementation after the implementation. In such business cases, the internal improvements (i.e. process efficiency) are easier to quantify (Reinartz et al., 2004). To do so, the indicator measures the actual business processes in marketing, sales and service.
Thereby the implementation of CRM influences the input of the processes, on the lead process-time and on the output of the process. The following four examples give an insight in CRM-specific process efficiencies (H. Smith & Fingar, 2003; Van Der Aalst, Wil M P et al., 2016; Weske, 2012):

1. CRM can **reduce the interfaces** between sub-processes and thereby eliminate media disruptions, if all participants are working in one central system;
2. CRM can **eliminate** unnecessary steps within the overall process, such as data entries into multiple systems;
3. CRM can **parallelise** steps within the process, because users can work together and collaborate;
4. CRM can **automatize activities** or diminish unnecessary (administrative) tasks within the overall process. Thereby, CRM can reduce the input or the overall process lead-time or it can increase the quality of the process or the. For instances, more leads could be qualified with the same resources and the same time.

Obviously, the internal improvements should remain and fully exploit after the actual project is finalised. In other words, if the implementation of CRM results in a reduction of 5% of administrative tasks during the sales process, this reduction should remain. Hence, it is key to calculate the internal efficiencies for a specific amortisation time; which is also valid for the external perspective (Aboody & Lev, 1998). Both, the external and internal success measures must be quantified and adjusted so that these measures can be used to calculate the quantified success of the project, with as little dependencies from other business areas as possible.

On the cost side, the organisation must consider all costs within the implementation of the project. This mostly includes **technical** costs, such as licensing, support contracts or additional hardware as well as the actual projects costs. **Project** (and administration) costs can contain internal and external personnel costs for requirement analysis, training and the implementation. Even if they are hard to estimate, **transition** costs are important to incorporate as well, as the whole organisation will need time to adopt to the new business processes and software (Bull, 2003). As this section is not entitled to discuss the cost structure and calculation of software implementations this rough categorisation will not be further detailed. Finally, as simplified computation the CRM project ROI can be calculated as follows:
Thereby the quantified success and the implementation costs contain the discussed categories in this section, which are summarised in the following figure:

**Figure 3—4: ROI calculation schema of CRM implementations**

Figure 3-4 summarises, that CRM success is the ratio between the total and quantified success and the sum of all implementation costs. Success measures are furthermore separated into external and internal success measures while implementation costs are rather flexible and project-oriented. After having discussed the approach of ROI measurement during a CRM project, the next section provides an overview on the relevant literature about CRM scorecards when measuring business performance.

### 3.6 Long-term measurement of BP via scorecards

The literature around business performance is extensive, and thereby the amount of studies on the actual measurement on BP is equally large. Overall, the importance of BP measurement has been widely researched in theory and organisations try to adopt those findings in practice since decades. Key concepts, like the balanced scorecard (BSC) have been evolved from a performance measurement tool into a strategic management model (Kaplan & Norton, 2001). At the same time various methodologies and approaches are developed to measure business performance under different circumstances, pre-conditions or with various targets. A well-
known and cited two-dimensional classification scheme highlights ten different approaches of business performance measurement from a strategic perspective and thereby focuses financial and operational aspects (Venkatraman & Ramanujam, 1986). As organisational performance is one of the most important topics in management research, Richard et al. (2009) discuss best practices and thereby consider the strong theoretical rational on the nature of performance. More precisely and within the context of CRM and BP measurement approaches and the corresponding metrics have to be considered. Within recent literature there are some approaches to measure the effect of CRM on business performance. Mostly a scorecard approach is presented which incorporates different indicators. For instances, Kim et al. (2003) introduce a cause-effect model as basis for the development of a scorecard. Hereby they differentiate between internal and external metrics that all impact customer satisfaction, knowledge, interaction and value and thereby influence the effectiveness of CRM; which drives business performance. Adding to this, Kim and Kim (2009) developed a scorecard measuring infrastructure of an organisation (e.g. IT infrastructure, employee satisfaction, management attitude, etc.), internal customer processes (e.g. retention) and external customer indicators (e.g. loyalty) that evaluates the impact on BP. Soeini et al. (2012) define CRM measures and map them to Kaplans BSC highlighting that the development of a BSC is company-specific as it should be linked to the firm strategy. While these examples show a clear focus on CRM, others focus more on one specific elements of CRM and consider the impact of these elements on customers in the different stages without developing a scorecard as their approach is rather one-dimensional. Moreover, the extend on scorecards that measure the impact of CRM on BP is limited. Scorecards overall are a well-known instrument to measure BP but vary a lot in their conceptual design and scope (Kaplan & Norton, 2001; Olve et al., 1999). Overall no consensus could be identified to specify key indicators for the measurement of CRM of business performance. Consequently, a scorecard must be proposed for the specific circumstances of the BP measurement and can be built into a practical framework (e.g. questionnaire of BP indicators for CRM) and into a theoretical conceptual model.
3.7 Balanced Score Card and CRM

The balanced scorecard itself comprises four dimensions, which are all linked and influenced by the corporate vision and strategy. Consequently, the BSC is a company-wide measurement instrument which originally does not focus on specific business areas, such as CRM. In this context, Horváth and Kaufmann (1998) discuss the BSC as tool for strategy implementation and identify key weaknesses when adopting the BSC, such as missing practical methodological knowledge. However, the BSC can be reduced to single areas of an organisation whereby CRM would be the centre of the BSC, as part of the vision and strategy. Looking at the BSC dimensions, similarities to the discussed BP dimensions in this chapter are obvious. To ensure a profound mapping of the BSC with the developed measurement scorecard for CRM & BP, the four traditional dimensions are shortly introduced:

1. The **financial** dimension raises the question of how an organisation has to perform to achieve financial success.

2. The **customer** dimension raises the question of how an organisation has to act in front of customers to achieve their vision and strategy.

3. The **learning and development** dimension raise the question of how an organisation has to change while managing their growth potentials to achieve their vision and strategy.

4. The **internal business process** dimension raises the question of where an organisation must be best-in-class to achieve their vision and strategy.

All four dimensions are linked with each other and to the vision and strategy. Moreover, an organisation should define targets, KPIs, guidelines and measures for each dimension (Weber & Schäffer, 2013). With that said, the question raises: What are the implications on BP measurement when implementing CRM?
To answer that questions, figure 3-5 suggests how the BSC structure should be adjusted when applying it to the field of CRM & BP. The fundamentals may not change, but there are slightly different associations:

First, the measurement scorecard for CRM & BP is obviously focusing on the CRM strategy and implementation instead of the corporate vision and strategy. Hence, CRM has a bidirectional influence on customers (i.e. external customer satisfaction) and internal business process (efficiency). At this point, there is no significant difference between the original BSC and the suggested scorecard. In contrast, the learning and development dimension is not reflected as own dimension but incorporated into the customer and internal business process dimension. As discussed earlier in this chapter, customer knowledge, employee satisfaction, change management etc. always have an influence on the internal perspective or the customer perspective. Thus, there is no need to measure this separately from a CRM standpoint even though it makes sense from a corporate-BSC standpoint. The second main difference can be seen when linking those two dimensions to the financial perspective. Kaplan and Norton (2001) see all dimensions interacting with each other as the BSC serves as strategic tool for management. Looking at it from a narrow CRM and performance measurement viewpoint, the effects of CRM on customers or internal business process efficiency do result in better (or worse) financials. Hence, the financial dimension does not interact with the others but remains as final performance indicator in terms of profitability.
3.8 Conclusion and impact of CRM on different organisations

Concluding this chapter, BP can be seen from different angles. First the distinction between direct and indirect effects of CRM on BP is key to understand what impact CRM has and where the leverage of its benefits is biggest. Thereby a differentiation (especially for the direct effects) according to customers, internal process efficiency and finally financial performance can help to prioritise CRM applications from the very beginning. Looking at the actual measurement of CRM and BP a short-term (project oriented) and a long-term approach has been identified. ROI calculations help to estimate whether the implementation pays off while scorecards support the monitoring of BP itself after having implemented the CRM software. A framework has been developed for both approaches. However, the question remains how these findings impact different organisations. As the data will be analysed according to organisational size and ownership, these two dimensions will be discussed.

First, the organisational size plays a major role in the approach and effect of CRM implementations. Even though SMEs must realise their implementations with limited financial resources (Lang et al., 1997), they have at least equally large opportunities when implementing CRM (Horowitz, 2005). These opportunities include the support of growing from a medium-sized organisation towards a large organisation and thereby develop organisational structures of a corporate company. By doing so, it is essential for growing SMEs to compete effectively within their globalised markets whereby they are influenced from multiple factors such as technological and organisational, organisational and environmental factors (Dwivedi et al., 2009). To achieved global competitiveness, it is essential for fast-growing SMEs to be able to identify market changes and quickly adapt to them, e.g. by changing their production (Smallbone et al., 1995). To do so, CRM systems can help to identify these market changes and therefore contribute to the over-proportional growth of SMEs and support the development towards a large organisation or even a corporate firm. With that said, it must be emphasised that the successful implementation of CRM systems are influenced by similar factors independently from the organisational size (Alshawi et al., 2011). At the same time, the size of the organisation indicates the likelihood of the successful adoption when implementing CRM (Nguyen & Waring, 2013).
Looking at the ownership of an organisation it is key to understand if a company is family-owned or family-led. If an organisation is family-led the management has a significant proportion of family-members so that the company and its operations are controlled by the family. Hereby Maury (2006) founds that the family-control increases business performance and active family ownership (where at least one C-level position is owned by the family) increases profitability as well. In contrast passive family control (i.e. family ownership without family-leadership) has no impact on the profitability when comparing this with non-family organisations. From a CRM-perspective, this makes sense, as CRM strategies and implementations will only be influenced (i.e. supported) if a family-member is actively involved in the top-management. Only if they are highly involved, they can influence major investment decisions such as a CRM implementation and contribute to their success. In comparison with the organisational size, Chu (2011) confirm that the association between family-ownership and business performance is stronger for SMEs, even though their study focuses on Taiwanese firms. Anderson and Reeb (2003) contribute, that the performance impact declines, when the share of family control exceeds 30%. Using a large cross-sectional analysis within S&P 500 they confirm that family firms are significantly perform better than nonfamily firms, mainly if one family member is involved in top management decisions on C-level (e.g. acting as CEO). Thus, their main finding and argumentation is in line with Maury (2006). Looking at this main findings from a German SME perspective, Classen et al. (2014) found that family SMEs tend to invest fast but also conservatively into innovation. Thereby they achieve better outcomes especially when putting these investments into process innovations (such as a CRM implementation) than non-family SMEs. With that said, it can be concluded that family businesses seem to be more successful as non-family businesses. However, looking at these leading studies a German B2B focus could not be found nor do they focus on the specific impact of CRM according to the organisational size and/or ownership. This research will test, within the context of CRM, if these findings can be confirmed. To do so, the following chapter will develop a conceptual framework as basis for the methodology and data gathering.
4. Chapter - Conceptual Framework

4.1 Introduction

The previous chapters offered a review of the literature on CRM and business performance measurement. The following chapter introduces the conceptual framework derived from the literature review. Hereby, the key concepts of CRM and BP are defined and introduced as well as the associations between these concepts. Lastly, the hypotheses of this research are developed and discussed in detail.

4.2 Conceptual Framework

The overarching concepts of aCRM implementation and business performance are associated in this dissertation, assuming that the usage of aCRM has a positive impact on business performance. Hence, the main research question from chapter one will be answered by deploying the following concepts for aCRM and business performance:

Figure 4—1: Conceptual framework between aCRM and BP

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**RQ:** How do large German B2B organisations implement and use CRM and what are the effects on their business performance?

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Figure 4-1 shows the relationships between the main concepts of aCRM and BP whereby a positive relation is assumed; i.e. the implementation and usage of aCRM has a positive impact on BP. To measure this main association, the concepts behind aCRM and BP have to be understood and defined. Therefore, the conceptual definition will introduce four main dimensions of CRM (A – D) and three dimensions of BP (E – G).
All these concepts are derived from the literature review and closely linked to the corresponding chapters. As figure 4-2 indicates, aCRM will be measured using four constructs. These constructs have been already challenged within section 2.7 by comparing it to the CMAT model. The constructs are ordered as they should be considered in practice, i.e. defining a strategy first, planning and implementing the software, using its analytics and finally measuring the success of the software implementation. Hence all constructs have a direct dependency on each other, starting with the superior strategy.

(A) CRM Strategy: The construct of CRM Strategy includes all strategic dimensions which must be considered when managing CRM within an organisation. On an organisational level CRM has to be embedded within the overarching business strategy. To do so, multiple strategic dimensions (e.g. channel management) must be considered, as discussed within section 2.4.

(B) CRM Planning and Implementation: The construct of CRM planning and implementation considers all aspects around the actual software implementation. After having defined the CRM strategy, the software component is key to implement the strategy. However, software implementations often fail, as they focus on technology (and innovation) from an IT perspective but little attention is spent on aspects like changes in business processes, change management and organisational adaptions. These aspects have been introduced in section 2.5 and will be operationalised within this construct.
(C) Analytical CRM: As this study focuses on the analytical part of CRM from a software perspective, this construct is essential. Thus, it includes the technological part of aCRM (i.e. what technologies may be used within the software) and the practical usage of these technologies (i.e. applications such as sales or customer profile analysis). Both aspects, technologies and applications, are based on the discussions in section 2.6 and thereby differentiated between ‘traditional’ analytics (i.e. Data Mining) and modern predictive analytics.

(D) CRM Success Measurement: Having defined the strategy, implemented the software successfully and thereby deployed modern analytics, the final step is to identify and measure the success of CRM. This concept therefore investigates this from a project-perspective. This means, that internal and external improvements – which should be achieved through CRM – are compared to the situation prior to the implementation. Consequently, this construct investigates if organisations are measuring the success of CRM or even calculate an ROI as discussed in section 3.5.

At this point the CRM software is being used within the organisation productively and the measurement of its impact on business performance becomes important. CRM influences BP directly (see section 3.3) or indirectly (see section 3.4). Referring to the balanced scorecard, the CRM impact on BP will be differentiated in three constructs:

(E) Internal business process: Looking at elements of internal process efficiency, this construct includes aspects like availability of data or the collaboration and communication between employees across departments. As a result, customers can be served faster, and a higher customer satisfaction can be achieved.

(F) External customer satisfaction: This construct focuses only on customer dimensions, such as customer referrals, ratings or the percentage of loyal customers. Even though customer satisfaction should be the key driver for any CRM implementation, it often gets neglected as the software implementation focuses more on pain-points of employees. With that said, it is obvious, that there is a close relationship and sometimes a conflict between internal processes and customer satisfaction. Ideally, organisations put CRM (and thereby customers) in the centre of all internal processes, so that these two constructs work hand in hand.
(G) Financial performance: At the end of the day, every organisation is measured by its bottom-line. That is why this last construct measures the financial performance of the organisation by key figures such as sales revenue, market share or profitability. Both, internal efficiency and customer satisfaction, contribute to this construct.

After having introduced the conceptual framework, it can be concluded, that all seven constructs are related to each other and investigate the main correlation between CRM and BP. To do so, five major hypotheses will be developed in the next section focusing on the CRM constructs and their impact on BP.

4.3 Hypotheses development

Figure 4-3 highlights, that the CRM constructs represent five relationships if they have a positive effect on BP, while the main hypothesis (H0) represents the relationship between CRM and BP overall. For the sake of simplicity, hypotheses between the CRM concepts and BP are formulated generally and not for each of the BP concepts, which would result in 16 hypotheses. When testing these hypotheses, a differentiation between the dimensions of BP can be discussed and will be indicated within the findings chapter.

Figure 4—3: Hypotheses Development
Consequently, the six hypotheses are defined as follows:

**H0 – Systematic CRM implementation positively affects business performance:** This hypothesis will test the overall impact of a systematic and elaborated CRM implementation on business performance across the discussed perspectives of CRM strategy, planning and implementation, analytical technology and success measurement. Hereby, it is assumed that CRM and BP are unidimensional constructs which are related to each other. Consequently, this hypothesis will answer the main research question and will be detailed with the following hypotheses.

**H1 - CRM Strategy positively affects business performance:** This hypothesis will test whether organisations that have a clearly defined strategy in place perform better. The scope and definition of a CRM strategy has been discussed and defined in section 2.4. Based on this, it is assumed that organisations, that have defined and implemented such a strategy perform better, due to the following four reasons:

1. **Customer centricity increases customer satisfaction**

   Historically, many organisations can be considered as brand centric. Especially in the German B2B sector many (family-owned) companies have been focusing on their product innovation and internal efficiency processes for decades and achieved great success. Nowadays, the mega-trends of digitalisation and globalisation became effective for all sectors and organisations must compete much more in a shorter time, due to high comparability of products and brands. For that reason, the product itself should become less strategically important while customer centricity should be focused. With that focus a CRM strategy is the starting point to define customer-centric targets, build a customer-centric organisational structure and finally to break-down and manage all activities correspondingly to increase customer satisfaction.

2. **Adjustment of internal activities and customer processes improves process efficiency**

   After having established a customer centricity mindset within the organisation, it is key to consider the operationalisation within the strategy. Consequently, all internal activities within the value chain must be concentrated on customer (groups) and their processes. Because, if an organisation decides to become customer centric, but still operates with brand-centric
processes, they are going to ruin their process efficiency. In other words, organisation that focus on the customer-process and align their internal activities correspondingly (with the aid of technology and good channel management) will increase their processes efficiency.

3. **Symbioses of efficiency and growth targets improves financial performance**

With that said, two contrary strategic targets must be managed. On the one hand, organisations must focus on customer centricity and invest money into growth-oriented initiatives and projects (e.g. up-to-date IT). On the other hand, process efficiency must be monitored ensuring profitability. To do so, a solid CRM strategy has to consider these two aspects to achieve financial improvements. Otherwise growth targets will always compete (and reduce) efficiency targets and vis versa.

4. **Focusing on CRM holistically improves financial performance**

Besides managing the competing targets of efficiency and growth, it is key to define CRM holistically and as company-wide strategy. Often, organisations see CRM as a pure IT project, where software should be the one and only enabler of business growth. Hence, many of these projects fail and impact the bottom line negatively. In addition, many organisations do not incorporate CRM within their business strategy or vision. In conclusion, a strategy helps to avoid a technical focus as well as the missing integration into the business strategy and improves financial performance.

**H2 - CRM Implementation and planning positively affect business performance:** This hypothesis will test whether organisations that plan their software implementation properly perform better. The success factors of CRM implementations have been discussed in section 2.5. Based on this, it is assumed that organisations, that have implemented CRM properly perform better, due to the following three reasons:

1. **Requirement definition improves customer satisfaction**

As discussed within H1, CRM implementations are often pushed by IT departments. Hence, there is a high chance, that business requirements are misunderstood or omitted. As a result, the project delivers CRM systems that does not fit the business (i.e. market and customer, requirements) but focuses more on internal processes or even unnecessary functionalities. With that said, it is assumed that organisations that have a clear requirement definition in
place deliver better CRM systems and therefore improve their customer satisfaction (but also
internal efficiency).

2. **Training, Change and Communication improves process efficiency**

While the requirement definition should mainly focus on customer satisfaction, training &
change management are focusing on the internal delivery and acceptance of the CRM
implementation. Without these aspects, the user acceptance of a new system is mostly low.
Individuals are – in their human nature - resistant to change. Hence, it is essential to
accompany the users when implementing a new CRM software. Otherwise the
implementation will fail in the beginning, as they will use the system wrongly or not at all.
Hence it can be concluded, that organisations that pay attention to good training, change and
communication will have a better user acceptance which improves process efficiency.

3. **Project management improves financial performance**

Lastly, a solid project management is key to ensure marketability as well as acceptance of the
CRM system and finally impacts the financial performance of the whole implementation
project. In the course of this, a project manager must ensure that the most important
requirements are implemented with the allocated budget in time. While this seems obvious to
all project managers, it is an interdisciplinary challenge to accomplish. Moreover, a strategic
approach for a project manager includes the development of the system implementation into
a programme management, which is closely linked to the functional departments and the
CRM strategy overall. Hence, it is assumed that organisations with an excellent project
management and a strategic development towards CRM strategy perform financially better
than others.

**H3 – Usage of aCRM technologies and adoption of business applications positively affect
business performance:** This hypothesis will test whether the availability and usage of analytical
technologies within the CRM software and the adoption of this technologies into business
applications impact business performance of organisation positively. The elements of
analytical CRM have been introduced and discussed in section 2.6. As the focus of this study
lies on the analytical part of CRM, two sub-hypotheses are defined and tested to answer the
hypotheses in greater detail.
H3a – Usage of aCRM technologies positively affect business performance

H3b – High adoption of aCRM business applications positively affect business performance

H3a focuses on the usage of available technologies within the organisation and therefore assumes that organisations that have implemented analytical technologies within CRM (i.e. clustering, classification, forecasting, data clustering and PA) perform better.

H3b focuses on practical business applications within the organisation and therefore assumes that organisations that have (formally) introduced the technology into their business departments (i.e. analysis of sales revenue, marketing campaigns, customer activities, customer loyalty, cross- and up-selling and reasons for customer complaints) perform better.

Hereby, it is assumed, that the availability of technologies is a pre-condition to make use of it, i.e. to develop business applications within the CRM system. However, and especially in smaller organisations it may also be conceivable that employees make use of the technology itself and apply it for themselves (within or without the CRM system). For instances, a forecasting technology may not be used to perform sales analysis within the CRM system, but employees use forecasting calculations for themselves by querying CRM data within the software or by exporting it.

Table 4-1: Summary of H3 assumptions

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<tbody>
<tr>
<td>H3b – High adoption of aCRM business applications positively affect business performance</td>
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<tr>
<td>H3a (+) Clustering</td>
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<td>H3a (+) Classification</td>
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Based on the literature, the assumptions of table 4-1 are made for the two sub-hypotheses. In conclusion, it is assumed that the usage of technologies (H3a) has the strongest impact on process efficiency and the high adoption of business applications (H3b) have a stronger impact on customer satisfaction and financial performance. Obviously, all the BP dimensions are complementary to each other.

**H4 - CRM success measurement positively affects business performance:** Lastly H4 will test, whether organisations that measure the success of their CRM implementations perform better. All BP measurement aspects have been reviewed and discussed in chapter 3, whereby section 3.5 focuses on the measurement of CRM implementation specifically. Based on this, it is assumed that organisations, that measure and monitor their CRM success perform better, due to the following two reasons:

1. **Monitoring CRM costs improves financial performance**

   Firstly, it is assumed that organisations that monitor their CRM costs, perform better in terms of cost efficiency and therefore better financial results can be achieved. With that said, a distinction can be made between non-operating costs and operating costs (i.e. after the implementation). Non-operating costs mainly consider expenses for the implementation of the software, such as training or IT development. On the other hand, operating costs include all running costs that must be considered when a CRM software is being used productively. If both costs are measured, monitored and managed properly, it is assumed that the organisations financial performance is positively affected.

2. **Monitoring CRM improvements increases business performance**

   Secondly, it is assumed that organisations that analyse their improvements, perform better. In other words, if a CRM implementation targets some specific improvements (e.g. increase lead-generation by 5%), these targets must be tracked. These targets can be classified according to the BP dimensions in external, internal or financial targets. Thus, it is assumed that tracking and managing these targets will positively affect business performance overall.

   If both, costs and improvements, are managed effectively, the CRM success can be analysed and assessed. With these findings, organisations can take corrective actions and communicate
successes which both results in a higher probability of success for CRM implementation and operations as well as for the overall business performance.

For all six hypotheses, the CRM constructs will be measured and compare to BP and its constructs (see chapter 5). The CRM constructs are defined as independent constructs which are measured with independent variables, because the characteristic of these CRM constructs influence the dependent construct of business performance. To measure this effect, business performance is measured with dependent variables in the dimensions of internal efficiency, external customer satisfaction and financial performance.

4.4 Summary

This section introduced the conceptual framework covering all aspects around CRM and BP. Based on the conceptual framework as well as on the previous literature review, relevant hypotheses have been introduced and briefly discussed. These hypotheses will be tested using the introduced methodology in the following chapter.
5. Chapter - Methodology

5.1 Introduction

This chapter describes the methodology of this research project. First, the applied methodology for the literature review will be introduced. Second, ethical principles of this research are introduced before the philosophy and paradigms as well as research ontology and epistemology are discussed. Next, all aspects around research reasoning and methodology itself are discussed resulting in a suitable research methodology for the survey. Afterwards the survey is explained in detail, covering the definition of the population, the applied sample sizes and the survey design itself. Based on the survey design, the operational definition of the questionnaire items and the applied measurement method (structural equation modelling) are introduced.

5.2 Literature review methodology

The presented literature review for CRM and BP follows a specific methodology, which will be explained shortly in this section. Within the initial literature review, three steps are applied to identify and summarise key authors for each of the constructs, as illustrated in the literature tables of appendix 1. Thereby the seven stages of a general literature from Hart (2018) are used and adopted, as illustrated in figure 5.1

**Figure 5—1: Applied literature review process based on Hart (2018)**

In **step 1 of the literature review**, a search strategy was derived from the research questions by identifying the key constructs within the field of CRM and BP. By doing so, keywords and thesaurus terms were identified and searched. In an iterative process, sub-concepts (e.g. CRM strategy) were identified. Again, for each sub-concept key words and thesaurus have been used to further explore the construct. Based on this search, relevant results were included and presented within the literature. Hereby number of citations as well as the published journal and the publishing date have been used as indicator to prioritise the literature.
In step 2 of the literature review and based on this prioritisation, an article was allocated to a specific CRM construct (see section 2.1) or a BP construct (see section 3.1). Thereby, the article was considered as ‘key resource’ and presented in the literature table of the corresponding construct with a short summary of it. Based on these key resources an abstract of the literature was presented for each construct with the literature table (cf. step three: Identify a method to summarise and synthesis literature).

In step 3 of the literature review, the literature tables were used to discuss the construct within the actual literature review. Again, an iterative process was applied whereby more literature have been included in the main discussion or within the summary tables, if they have been considered as ‘key resource’ due to their high number of citations, published journal or publishing date. By doing so, the discussion evolved and more detailed sections have been introduced. For instances, more detailed technologies and applications for data mining or predictive analytics have been identified and the literature review was divided into two separate sections for each of the technologies (i.e. section 2.6.1 and section 2.6.2 for data mining and section 2.6.4 and section 2.6.5 for predictive analytics).

Based on the literature discussion, the conceptual model has been developed as well as the corresponding items for the questionnaire. The questionnaire items have been linked to the key resources from the literature table, as presented in section 5.9. Based on the questionnaire items, the data analysis will be conducted and the findings as well as the presented results are discussed again against the existing literature review. Technically, the university online library was mainly used to perform the advanced search working with the identified keywords and thesaurus words. In addition, Google scholar was used to assess the number of citations for specific literature. Afterwards, ‘Citavi’ was used as Citation manager software but also to summarise key articles.

In conclusion, this research is focusing on the quantitative data analysis aiming for contributions to knowledge and empirical findings. Hence, the applied literature review process followed an iterative process and compared, generalised and discussed the literature to derive hypotheses from it for the actual data analysis (see section 4.2 and 4.3). Certainly, a more granular literature review process will enrich the discussion of the findings and may result in further perspectives for the hypotheses development. However, this research targets
a quantitative and generic statement, wherefore the applied literature review process was chosen. Next, the ethical principles and the corresponding ethical review will be presented.

5.3 Ethical principles

As ethics are principles to ensure that the behaviour and action within research activities are done in the right way, a formal ethical procedure was applied according to the university standards. Ethical correctness is within the research to avoid causing harm, distress, disadvantages or anxiety for the survey respondents or any other stakeholder within the research. Moreover, the personal ethical principles of the researcher must be taken into consideration, so that the researcher is not biased or has any advantage or disadvantage which may lead to misleading research activities or interpretations. For instance, if the researcher does not clearly state what the study is researching and what the aim of the study is, the respondents may provide answers which they would have given differently, if they would have known the intend of the study. From a formal perspective issues around privacy, data storage and consent must be pro-actively managed and considered (Diener & Crandall, 1978). To guarantee, that all these aspects are covered adequately, the code of practice for research from the UK RIO Code of Practice is applied and an ethical review of this research was done by the ethical committee of the University of Portsmouth. The approved application can be seen in appendix 7. This ethical application has been submitted and approved prior to the data gathering and included the following subjects:

1. **Study Title and key dates** to ensure that the data collection takes place in a specific period.

2. **Application details** to understand who is applying and what the researchers’ background is and **Details of peer reviews** to understand when and how often the researcher exchanges with the supervisory team.

3. **Funding details, sites and locations as well as insurances** to guarantee that no risks are occurring in these areas.

4. **Aims and Objectives as well as a study summary** to understand the content of the research and its implications on the participants (e.g. ethical risks like data security).
5. **Description of the methodology** to avoid misinterpretations or ethical incorrectness when gathering data with a non-appropriate method.

6. **Compliance** with codes, laws etc. to ensure that the research follows clear guidelines.

7. **Recruitment of participants** to evaluate if the participants will consent and that they are not forced or biased to answer the questionnaire.

8. **Data security** to secure all relevant data and prevent potential data losses or misuse.

9. **Publication, Impact and dissemination plans** to evaluate the import of the findings.

10. **References, appendences and declaration** to gather all other relevant data within this research.

With the thorough consideration of these 12 ethical subjects, the study covers all relevant aspects around consent, confidentiality, data security, independency and anonymity for the researcher, the participants and especially for the organisations of the participants. Lastly and additionally the panel provider ‘Bilendi’ ascertains that all potential participants provide consent to be part of the panel and thereby also agree to GDPR guidelines. Specifically, for this study, the invitation and consent letter (in the beginning of the survey) secures, that the participants consent to the study and understand the purpose of it (Bell, 2014; Lee, 2008). In summary, ethical considerations are considered thoroughly from four perspectives. First, the ethical committee of the UPO has reviewed the research. Second, the researcher complies to the to the UK RIO Code of Practice. Thirdly, all panel members have consent to GDPR\(^4\) and general terms and conditions\(^5\) from the panel provider ‘Bilendi’ during the registration process and prior to the survey invitation. Fourthly, the questionnaire itself includes a dedicated consent form which explains the purposes of the study as well. With this set of measures, the ethical considerations have been assessed in this section and this chapter has addressed all relevant aspects. The next section continues with aspects around philosophy and paradigm for this research.

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\(^4\) GDPR: [https://de.meinungsplatz.net/static/index/data-privacy](https://de.meinungsplatz.net/static/index/data-privacy)

\(^5\) Terms & Conditions: [https://de.meinungsplatz.net/static/index/terms-of-use-v2](https://de.meinungsplatz.net/static/index/terms-of-use-v2)
5.4 Research philosophy and paradigm

During the whole research process the researcher interacts with humans, as it takes place in social business research. Subsequently, assumptions about human behaviour are underlying at any time – either deliberate or unconscious. Following this logic, the design of the research questions, the data collection as well as the interpretation of findings must be evaluated and incorporated within research philosophies and paradigms (Crotty, 1998). In simple terms, research paradigms can be defined and explained as ‘the world view’ and the ‘set of beliefs’ about it. There are two contradicting perspectives. **Positivists** who argue that a real world exists, and phenomena can be viewed isolated and thereby easily measured. **Interpretivists** on the other side suggest that the whole construct of the phenomena cannot be divided into single parts and it can only be understood within the context of social constructs. Both viewpoints illustrate two extreme positions where many intermediate concepts have been established over time (Saunders et al., 2009).

Identifying the appropriate paradigm, the research question and objects are analysed in more detail. The main research question can be characterised as ‘*how*’- question, as it aims to provide an explanation on how organisations use CRM and analytics maximising their business performance. This portends a subjectivist element in the research, which is going to interpret the results and conclude findings.

Furthermore, the combination of CRM and BP will be researched, which also indicates that relationship elements of those two concepts play a significant role and correlations may be identified.

Overall RO1 – RO3 aim to **identify, evaluate** and **develop** things to answer the research question with appropriate concepts and methods. Based on this heterogeneous set of aims it can be stated, that the author does not believe in one of the extreme positions and therefore none of them can be perceived as directing research paradigm.

Studying the two main intermediate concepts Saunders et al. (2009) discusses **pragmatism** and **realism** as alternative research paradigms. **Pragmatists** consider research only as relevant, if actionable results can be derived, which is a main objective of this research. Moreover, different views are considered, wherefore credible methods are used in pragmatistic research.
However, the fact that no single point of view is being accepted in the pragmatism paradigm, implies that the identification of distinctive correlations between different concepts – based on objective data – may not be accepted by pragmatist.

The realism paradigm is associated with the positivism paradigm, stating that reality exists independently from human perception. At the same time reality is being interpreted. The two types of realism (direct and critical realism) assume that a reality exists, but human interpretation makes sense of it, based on the context of social constructs. The direct realism suggests, that the world does not change frequently, and the perceived reality is what can be considered as fact. In contrast, the critical realism asserts that all our experiences are perceptions which create the image of our reality, but which are not the reality itself. This implies that reality is being interpreted by society and humans. In addition, critical realism accepts that the world is constantly changing and therefore multiple perspectives must be taken into consideration. Nonetheless, critical realism assumes that a reality exists independently from human interpretation but is being perceived heterogeneously.

Concluding this discussion, the critical realism paradigm is being considered as most appropriate. Firstly, critical realists accept that reality exists independently. RO1 and RO2 will identify and evaluate the impact of CRM on BP. Thereby, an objective result is being expected to find out how organisations implement and use CRM and how that impacts their BP. Hereby, correlations may be recognized between CRM and BP as well as within the actual constructs of CRM and BP. Secondly, critical realism argues that the objective reality is perceived by individuals within the context of social constructs. The main research question will be answered in an explanatory way, by gathering quantitative data and therefore in depth knowledge about the affected organisations (Collier, 1994; Niiniluoto, 1999). The next chapter will discuss the ontology and epistemology implications of the critical realism paradigm within this research.
5.5 Ontology and epistemology

Ontology can be described as ‘study of existence’ which is based on the beliefs of nature of reality and knowledge. Subsequently, ontology describes how the world operates and what views of the existence may have to be taken into consideration by the researcher. Again, two main positions have been identified by several authors, whereby the terminology from Saunders et al. (2009) is applied in this section.

On the one hand, objectivism can be described as position where things exist as real constructs, independently from social actors (Crotty, 1998). This view is highly linked to the positivism paradigm and therefore researchers are studying phenomena which are real, meaningful and mostly measurable. Objectivists conclude that the essence of the researched case (here: correlation between CRM and BP) does subsist, even though it may differ in the variety of how it is being used by organisations (Diesing, 1966).

Subjectivists on the other hand argue that things and social phenomena are created through the social individuals who perceive the essence of the researched case (Holden & Lynch, 2004; Saunders et al., 2009). Hence, it would be concluded that the correlation between CRM and PA in sales is only important for the affected CRM experts or sales people who make meaningful sense out of it. Consequently, the phenomena do only exist because individuals who believe in it and act correspondingly.

Again, for this research a mixed ontological perspective will be taken into consideration because the research objectives are heterogeneous. RO1 and RO2 are approaching the research from an ontological objectivistic perspective, because and according to the critical realism a reality exists independently from human thoughts. The correlation between CRM and BP will be researched and evidently proven. On the other side, RO3 and the main research question describe how CRM can be used to improve BP and therefore they are ontologically subjective because the proven reality is interpreted through social conditioning (Holden & Lynch, 2004). Based on the ontology, epistemology can be described as theory of knowledge and describes the relationship between the researcher and the knowledge and thereby discusses what can be considered as acceptable knowledge. As this research has been classified as critical realism...
paradigm with a mixed ontology the epistemology is two-layered as well (Stanley & Wise, 2002).

Firstly, RO1 and RO2 with their objectivistic ontology are aiming to gather propositional knowledge from a rationalism epistemology perspective, whereby the knowledge is attained through objective and rational data gathering and interpreted with meaningful reasoning. In practice, this research identifies and evaluates constructs of CRM and BP in B2B organisations with the support of quantitative data. Secondly, RO3 and the main research question with their subjectivist ontology are aiming to provide (practical) answers insights from an empirically epistemology perspective whereby knowledge is created by explaining constructs and their correlations. In practice, this research will answer the research question with the support of a developed research instrument, which is based on quantitative data from RO1 and RO2 (Saunders et al., 2009; Tuli, 2011).

In conclusion, the researcher will first identify and evaluate objective and theoretical knowledge. Afterwards, this gathered knowledge will be interpreted in a subjective way explaining the phenomena and develop a research instrument. Consequently, contributions to knowledge as well as practical and actionable insights will be generated.

5.6 Research reasoning and methodology

After having discussed the research philosophy, this section covers the research reasoning.
Being clear about the reasoning for your research before the research actually started raises important questions about the design of the research and defines the way of argumentation. Ketokivi and Mantere (2010) describe two approaches which can be adopted for the research reasoning. Arguing deductively a researcher starts reviewing the theory and develop initial hypotheses, based on that theory. Afterwards, observations help to test the hypotheses and explain correlations within the gathered data. This finally confirms or rejects the hypotheses and can be linked back to the theory. From an inductive perspective, the researcher argues vice-versa. Starting with observations, a specific pattern can be identified and used to describe hypotheses and finally link this back to theory (Karplus & Butts, 1977; Lawson, 1985).

This research can be classified as deductive, as it primarily uses quantitative data and tests hypotheses with the structural equation modelling. Based on the reviewed theory in chapter
2, a structural model and the corresponding hypotheses were developed in chapter 4 and the data analysis will prove or disprove these hypotheses. In specific, the theory shows that CRM is widely known and implemented across various constructs. According to theory, organisations perform better, if they use CRM properly. The most important CRM constructs and their impact on BP are tested with six hypotheses. To do so, observations are made by using the structural equation model and thereby the confirm or reject the hypotheses. Having said that, the research methodology must be discussed next.

**Research methodology** can be described as a strategy to gather data which includes the assumptions derived from the ontological and epistemological believes. Consequently, the research methodology describes a general plan to answer the research question and its sub-objectives and is based on the research paradigm including the ontological and epistemological assumptions as well as the discussed research reasoning. Structuring this paragraph, Saunders et al. (2009) ‘research onion’ is used to describe the research methodology. Thereby the philosophies and approaches (research reasoning) have been discussed already and this section covers the research strategies, methods and time horizons before the following chapters discuses all aspects around sample size and survey design.

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**Figure 5—2: Research methodology based on Saunders et al. (2009)**
As illustrated in figure 5-1 the methodology begins with the described realism philosophy and a deductive reasoning approach. Based on that, and to test the hypotheses, a survey will be used as research instrument. The survey includes standardised quantitative questions to assess the implementation and usage of CRM as well as to indicate the performance of the organisation compared to its nearest competitors. The research is mono methodological (quantitative only) and cross-sectional as the survey will be conducted once across multiple industries but within a defined target group. The data collection itself will be conducted with an external service provider to ensure that the sample size can be achieved. To do so, 16 full-service providers have been contacted and asked to submit an offer that includes the programming of the survey, the access to a B2B panel and the tabulation. Only four could offer that service as online questionnaire with the needed sample size (see next section). At the end, ‘Bilendi’ was chosen as their offer included all the above-mentioned services to the best price per interview within the shortest field-time. The next section will discuss all aspects around sample size and selection strategy in detail.

5.7 Population, probability sample and response rate

To define the needed sample size, the overall population must be identified first. Hence, it is necessary to identify the number of all German B2B organisations. As presented in table 1.1 German B2B organisations have some key characteristics. From these characteristics the family-ownership (or leadership) as well as the size of the organisation are mostly used to define German B2B organisations. As Chua et al. (1999) suggest, that family involvement are weak indicators for family businesses this characteristic will not be used within the formal population definition. Moreover, characteristics which cannot be easily assessed and quantified will not be incorporated (e.g. technology oriented).

Finally, the size of the organisation will be used as main differentiator. With that said, the number of employees is used as best possible indicator, as the turnover can vary heavily from industry to industry (e.g. technology or retail companies achieve higher turnover as manufacturing companies). Consequently, the targeted organisations can be defined as:

Medium and large sized companies with a total number of employees between 250 and 10,000 which are operating within the B2B industry.
Based on the organisational definition a number of needed participants (organisations) for the survey is calculated, with the help of Saunders et al. (2009) 95% confidence level table for statistical probability sampling. To find out, how many organisations exists within that defined population the leading statistical institution (Statista) has been contacted. Unfortunately, there are no specific figures for organisations with a total number of employees between 250 and 10.000. The only available figure indicates the number of organisations with more than 250 employees. With that said, the most recent statistic refers to the year 2017 and the absolute population can be defined with $n = 15.061$ organisations (Statista, 2018). Using that as basis, the needed probability sample can be defined by using a 95% confidence and a margin error of 5% with $n = 378$. The confidence level is probably even higher, because the population size for this confidence level could be increased up to 25.000 organisations but in this scenario the 15.061 organisations are more than 100% of the affected organisations as they include companies with more than 10.000 employees as well (Saunders et al., 2009). As this figure is not known, it can be only estimated, that maximum 500 organisations in Germany employ more than 10.000 employees. However, statistical confidence must be ensured and therefore it is assumed that the total population is 15.061 as mentioned above. Within the survey, the participants are asked about the size of their organisation and are only allowed to continue, if they represent an organisation between 250 and 10.000 employees. Moreover, they are asked, if their organisations are operating within a B2B environment, as this study focuses purely on B2B organisations. After having defined the sample size from an organisational perspective, the participants must have CRM background or experiences. In other words, only participants who are working with CRM systems can take part in the survey. To do so, the participants are asked how many years of CRM experience they have and are only considered if they have more than one year of CRM experience. Hereby, it is not relevant if the participant is a CRM user, project manager or has any other experience with a CRM software. Figure 5-2 summarises the population and probability sample sizes definition with the three key characteristics: Number of employees, B2B industry and experience with CRM.
With the inclusion criteria above, the total response rate can be calculated based on the final participation metrics from the online survey. Overall 4,085 participants started the survey and 500 completed it, which means, that 3,585 participants were ineligible as they did not meet the inclusion criteria (see figure above). The response rate within the population can be calculated as follows:

$$\text{Response rate within population} = \frac{\text{Total number of responses}}{\text{Total number in sample}} = \frac{500}{15,056} = 3.3\%$$

As statistical inference is necessary, the number of responses has been increased to 500, which means that the sample size is 32% (n = 122) bigger than statistically required. A random sampling technique was applied to gather the data with the usage of a panel. That means, the survey was simply send to all panel members and relevant people have been identified with drop-out questions. The next section explains how the survey was designed and how the survey questions were defined.
5.8 Survey design and interview questions

The survey was introduced as the main research instrument within the research methodology (chapter 5.3), as this research focuses on quantitative data applying a deductive research reasoning. The research question and the subsequent research objectives can be classified as descriptive research. Within that descriptive research, standardised data within a large population will be gathered. Moreover, the gathered results should be standardised to allow a comparison of the results within the large number of respondents. Afterwards data can be analysed using statistical data, i.e. apply the SEM model and to identify relationships between the variables and the constructs within the conceptual model. (Saunders et al., 2009; Sudman & Bradburn, 1983) To do so, an intensive amount of time was invested into the development of the questionnaire. After the questionnaire was finalised, it was piloted with twelve pilots (using an excel questionnaire) and the feedback was incorporated into the questionnaire. Thereby, explanations were added, wording was changed, and some questions were eliminated to maximise the simplicity of the survey. After the pilot phase, the questionnaire was translated into German language, as most participants are native in German language. The German questionnaire was back-translated by a native bilingual (German and English) speaking colleague to minimizing translation-errors. Some minor amendments have been made within this iterative progress until the final German and English version was ready to be programmed. After ‘Bilendi’ programmed the survey into the online questionnaire tool, it was tested again by the research team. Hereby, the questionnaire items were double-checked and the actual functionality of the survey was tested by several respondents. In doing so, the usability and the mobile functionality was tested as well to ensure an optimal user interface and thereby maximise the response rate. Finally, the survey was approved and send out to the panel several times during the field work. The questionnaire itself included three major areas, which are explained in the next paragraph where the questionnaire items and the answer scales are discussed. Before the questionnaire starts with some introduction questions, an invitation letter and consent form was added, which had to be agreed on before asking starting the actual survey. This invitation letter and consent form can be seen in appendix 8 and the final surveys in appendix 9.
Section 1 - Introduction

The introduction of the survey includes 15 question items that aim to identify exclusion criteria and to gather data for the analysis stage. Thereby question #1 until #3 are testing, if the respondent belongs to the population by asking for the number of employees (question #1), the experience with CRM (question #2) and if the organisation operates within the B2B industry (question #3). The remaining 12 questions have no exclusion criteria but offer a wide variety of data to cluster the results later. These questions included further organisational characteristics (turnover, location, etc.) as well as personal characteristic (e.g. job role). The scales were mostly pre-defined drop-down fields including the option to specify the answer, if none of the options fit (e.g. job hierarchy). A few questions can be answered with free text fields (e.g. job position) and must be grouped afterwards.

Section 2 – Customer Relationship Management

Section two includes all relevant questions regarding CRM and its five constructs, which have been introduced and operationalised within the conceptual framework (see table 5-1). All question items within this section of the questionnaire follow the same scaling. Thereby a 7-point scale has been applied asking for the level of agreement from ‘strongly disagree’ to ‘strongly agree’. Every construct is explained and displayed on one page, so that the responses can be compared within this construct. Figure 5-3 shows how the construct of CRM Measurement has been implemented within the survey. Moreover, the wording of the question items has been standardised so that it is easy for the respondent to read the question quickly and capture the difference question items. In the example below the questions always started with ‘Our CRM strategy measures...’ investigating for different aspects of CRM measurement (i.e. operational costs) which have been underlined. Moreover, examples are given and indicated with bold font. Consequently, section two of the survey includes five pages (one page per construct) and 26 question items evaluating the implementation of CRM.
Section 3 – Business Performance

Section three includes all relevant questions regarding business performance and its three constructs, which have been introduced and operationalised within the conceptual framework (see table 5-1). All question items within this section of the questionnaire follow the same scaling. Thereby a 10-point scale has been applied asking for a performance comparison of the organisation with its nearest competitors. In other words, the respondent indicates (subjectively) how his/her organisation performs in different categories using different question items. This subjective performance indication allows a comparison without gathering specific performance data such as turnover development and the respondents assess their organisation with competitors within their industry / market place. Again, all question items of one BP construct are displayed and answered on one survey page, so that the respondents can compare their answers within one dimension. Figure 5-4 shows the question items for the internal business performance. Within the 10-point scale, the respondents assess the performance of their organisation between ‘much worse’ (0) and ‘much better’ (10). Simultaneously to section two, explanations or examples are indicated with bold font and the...
essential changes within the question item are highlighted as underlined. Using a slider to give the answers, the usability is easy to understand and quick to adopt. Consequently, the survey includes three pages (one page per construct) and 17 question items evaluating the business performance of the affected organisations.

**Figure 5—5: Survey - Business performance section**

After having discussed all research methodology aspects, sampling size and population as well as the survey design, the next section will discuss how the questionnaire has been operationalised.

### 5.9 Operational definition

This section discusses the iterative process of the operationalisation of the constructs from the previous chapter. Based on the literature review, every concept is detailed with sub-elements. Based on these sub-elements, questions are defined to measure the sub-elements and operationalise the construct. As a result, the first questionnaire contains 74 questions not including the introduction questions. Appendix 4 shows this first draft of the operationalisation with all its sub-elements and variables (i.e. questionnaire items). Within nine major iterations, the questionnaire was simplified, and each construct is measured by a
hand-full of variables. This final version of the questionnaire can be seen in appendix 5 and serves as basis for the operational definitions of all seven constructs.

Table 5-1: Overview of independent and dependent variables

<table>
<thead>
<tr>
<th>Customer Relationship Management</th>
<th>Business Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construct</strong></td>
<td><strong>Independent</strong></td>
</tr>
<tr>
<td><strong>Variables for operationalisation</strong></td>
<td></td>
</tr>
<tr>
<td>(A) CRM Strategy</td>
<td>1. Customer groups</td>
</tr>
<tr>
<td></td>
<td>2. Sales Channels</td>
</tr>
<tr>
<td></td>
<td>3. Up-to date IT</td>
</tr>
<tr>
<td>(B) CRM Planning and Implementation</td>
<td>1. Process to define requirements</td>
</tr>
<tr>
<td></td>
<td>2. Training programme</td>
</tr>
<tr>
<td></td>
<td>3. Change Management programme</td>
</tr>
<tr>
<td></td>
<td>4. Communication process</td>
</tr>
<tr>
<td></td>
<td>5. Project management</td>
</tr>
<tr>
<td>(C.1) Analytical CRM - Technologies</td>
<td>1. Clustering</td>
</tr>
<tr>
<td></td>
<td>2. Classification</td>
</tr>
<tr>
<td></td>
<td>3. Forecasting</td>
</tr>
<tr>
<td></td>
<td>4. Data Visualisation</td>
</tr>
<tr>
<td></td>
<td>5. Predictive analytics</td>
</tr>
<tr>
<td>(C.2) Analytical CRM - Usage</td>
<td>1. Sales revenue</td>
</tr>
<tr>
<td></td>
<td>2. Marketing campaigns</td>
</tr>
<tr>
<td></td>
<td>3. Customer activities</td>
</tr>
<tr>
<td></td>
<td>4. Customer loyalty</td>
</tr>
<tr>
<td></td>
<td>5. Cross- and up-selling</td>
</tr>
<tr>
<td></td>
<td>6. Reasons for customer complaints</td>
</tr>
<tr>
<td>(D) CRM Success measurement</td>
<td>1. Implementation/ non-operating costs</td>
</tr>
<tr>
<td></td>
<td>2. System operating costs</td>
</tr>
<tr>
<td></td>
<td>3. Internal improvements</td>
</tr>
<tr>
<td></td>
<td>4. External improvements</td>
</tr>
<tr>
<td></td>
<td>5. Financial improvements</td>
</tr>
<tr>
<td>(G) Financial performance</td>
<td>1. Total costs of Ownership (CRM)</td>
</tr>
<tr>
<td></td>
<td>2. Sales revenue</td>
</tr>
<tr>
<td></td>
<td>3. Conversion rate (lead to order)</td>
</tr>
<tr>
<td></td>
<td>4. Net profit margin</td>
</tr>
<tr>
<td></td>
<td>5. Market share</td>
</tr>
</tbody>
</table>

To get a better overview of the variables, table 5-1 summarises all variables for the operationalisation of the constructs. As seen in the previous section, all these variables have been asked within the survey as separate questionnaire item using a 7-point scale for CRM and a 10-point scale for BP. Moreover, the literature review process and the transition from the literature towards the identified questionnaire items has been presented in section 5.2. Within the literature review, no suitable set of measures could be identified, which could have been used for this research. This can be justified due to the following three reasons. First, none of the available studies did offer a complete quantitative set of measurement items, that could have been used for more than one construct. Consequently, existing constructs or items had to be derived from key articles and transformed into suitable questionnaire items (e.g. A.4 or A.4). Second, if a construct was researched by one article, measurement items were not available because they have been discussed from a conceptual or qualitative perspective (e.g. C.1.1 – C.1.4). Third, some single measures were applicable but could not been used one-to-
one because they were reworded and therefore not applicable to the existing survey structure resp. measurement scale (e.g. G.4 or G.5). Fourth and last, some relevant measurement items were simply not available but should have been incorporated due to the existing literature review and the practical experience of the author (e.g. B.1. and G.3). Consequently, the deduction of the questionnaire items (from the literature) must be illustrated clearly.

**Table 5-2: Source & development of questionnaire items**

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>Source &amp; Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.1 Customer groups</td>
<td>Adopted from Iriana and Buttle (2006) combining the first two strategic items</td>
</tr>
<tr>
<td>A.3 Up-to date IT</td>
<td>Adopted from Nguyen and Waring (2013) hypotheses H1 &amp; H3 and further supported by Chang et al. (2010)</td>
</tr>
<tr>
<td>A.4 Customer Feedback</td>
<td>Derived from the strategic framework of Payne and Frow (2005) and supported by the CRM definition of Swift (2001)</td>
</tr>
<tr>
<td>A.5 Business Strategy Vision</td>
<td>Derived from the strategic framework of Payne and Frow (2005) and further support from different articles (Bull, 2003; Heinrich &amp; Johannesson, 2005; Schilke et al., 2009)</td>
</tr>
<tr>
<td>B.1 Process to define requirements</td>
<td>Self-developed based on Winkelman (2013) and practical experience.</td>
</tr>
<tr>
<td>B.2 Training programme</td>
<td>Derived from the findings of different articles (Alshawi et al., 2011; Schiewe, 1995; Shum et al., 2008).</td>
</tr>
<tr>
<td>B.3 Change Management programme</td>
<td>Derived from the findings of different articles (Alshawi et al., 2011; Schiewe, 1995; Shum et al., 2008).</td>
</tr>
<tr>
<td>B.4 Communication process</td>
<td>Adopted from Nguyen and Waring (2013) hypotheses H2 and further support from Chen and Popovich (2003)</td>
</tr>
<tr>
<td>B.5 Project management</td>
<td>Derived from the findings of different articles (I. J. Chen &amp; Popovich, 2003; Wilson et al., 2002) and based on practical experience</td>
</tr>
<tr>
<td>C.1.1 Clustering</td>
<td>Derived from classification framework for DM in CRM (Ngai et al., 2009)</td>
</tr>
<tr>
<td>C.1.2 Classification</td>
<td>Derived from classification framework for DM in CRM (Ngai et al., 2009)</td>
</tr>
<tr>
<td>C.1.3 Forecasting</td>
<td>Derived from classification framework for DM in CRM (Ngai et al., 2009)</td>
</tr>
<tr>
<td>C.1.4 Data Visualisation</td>
<td>Derived from classification framework for DM in CRM (Ngai et al., 2009)</td>
</tr>
<tr>
<td>C.1.5 Predictive analytics</td>
<td>Derived from Mishra and Silakari (2012)</td>
</tr>
<tr>
<td>C.2.1 Sales revenue</td>
<td>Derived from the findings of different articles (Baekte &amp; van den Poel, 2013; Bohanec et al., 2016; Kelly, 2000) – see also section 2.6.2 part 1</td>
</tr>
<tr>
<td>C.2.2 Marketing campaigns</td>
<td>Derived from the findings of different articles (Chablo, 2001; Guido et al., 2011) - see also section 2.6.2 part 3</td>
</tr>
<tr>
<td>C.2.3 Customer activities</td>
<td>Mainly derived from Khachataryan (2012) findings</td>
</tr>
<tr>
<td>C.2.4 Customer loyalty</td>
<td>Derived from the findings of different articles (Hosseini et al., 2010; Long et al., 2013) - see also section 2.6.2 part 4</td>
</tr>
<tr>
<td>C.2.5 Cross- and up-selling</td>
<td>Mainly derived from Krishna and Ravi (2016) findings</td>
</tr>
<tr>
<td>C.2.6 Reasons for customer complaints</td>
<td>Mainly derived from Mirzaei and Iyer (2014) findings</td>
</tr>
<tr>
<td>D.1 Implementation/ non-operating costs</td>
<td>Derived from the findings of different articles (Cooper, 1994; Dalcher &amp; Gens, 2003)</td>
</tr>
<tr>
<td>D.2 System operating costs</td>
<td>Derived from the findings of different articles (Anton &amp; Petouhoff, 2001; Bohling et al., 2006).</td>
</tr>
<tr>
<td>D.3 Internal improvements</td>
<td>Derived from the findings of different articles (Josiassen et al., 2014; Li &amp; Mao, 2012; Reinartz et al., 2004; Michael Rodriguez &amp; Honeycutt, 2011) - see also section 3.3 part 1 and appendix 2.</td>
</tr>
<tr>
<td>D.4 External improvements</td>
<td>Derived from the findings of different articles (Kim et al., 2003; Long et al., 2013; Mithas et al., 2005; Reinartz et al., 2004; Zeynep Ala &amp; Toker, 2012) – see also section 3.3. part 2 and appendix 2</td>
</tr>
</tbody>
</table>

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To support the operationalisation process, table 5-2 links the literature tables (i.e. the key authors and their measurement items) from appendix 1 with the presented operationalised items from table 5-1. Hereby table 5-2 clearly presents the source of the questionnaire items and provides a short explanation how the items have been created. In other words, if they have been adopted from an existing questionnaire item, derived from a conceptual discussion or findings, or self-developed.

### 5.10 Measurement via Structural Equation Model

After the previous section has shown how the constructs are operationalised, this section will introduce the structural equation model (SEM) as analysis and measurement model. SEM is characterised by its multivariant techniques, which are all incorporated within one model. Thereby it includes factor and path analysis, regression, measurement theories and simultaneous equations. With that said, it is very useful to address complex and multi-faceted constructs whereby specific relationships between the constructs are measured. It focuses on direct effects and on mediating elements within that system of constructs. As SEM can be described as a path analysis using latent variables, these two ideas will be described in the

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>D.5 Financial improvements</strong></td>
<td>Derived from the findings of different articles (Coltman et al., 2011; Krasnikov et al., 2009; Rapp et al., 2010) – see also section 3.3, part 3 and appendix 2</td>
<td></td>
</tr>
<tr>
<td><strong>E.1 Collaboration</strong></td>
<td>Derived from Michael Rodriguez and Honeycutt (2011)</td>
<td></td>
</tr>
<tr>
<td><strong>E.2 Effectiveness of communication</strong></td>
<td>Derived from Khodakarami and Chan (2014) and Winer (2001)</td>
<td></td>
</tr>
<tr>
<td><strong>E.3 Access of customer information</strong></td>
<td>Derived from Jafari Navimipour and Soltani (2016)</td>
<td></td>
</tr>
<tr>
<td><strong>E.4 Lead time of customer processes</strong></td>
<td>Derived from balanced scorecard of Kim and Kim (2009)</td>
<td></td>
</tr>
<tr>
<td><strong>E.5 Perceived employee satisfaction</strong></td>
<td>Derived from balanced scorecard of Kim and Kim (2009)</td>
<td></td>
</tr>
<tr>
<td><strong>E.6 Complexity of processes</strong></td>
<td>Derived from the CMAT model (Woodcock, 2005) and the findings of Al-Mudimigh (2007)</td>
<td></td>
</tr>
<tr>
<td><strong>F.1 % of Customer survey responses</strong></td>
<td>Derived from the customer retention dimension of Mirzaei and Iyer (2014)</td>
<td></td>
</tr>
<tr>
<td><strong>F.2 % of customer referrals</strong></td>
<td>Derived from the customer retention dimension of Mirzaei and Iyer (2014)</td>
<td></td>
</tr>
<tr>
<td><strong>F.3 % of positive customer ratings</strong></td>
<td>Derived from the customer retention dimension of Mirzaei and Iyer (2014)</td>
<td></td>
</tr>
<tr>
<td><strong>F.4 Response time to customers</strong></td>
<td>Derived from the customer retention dimension of Mirzaei and Iyer (2014)</td>
<td></td>
</tr>
<tr>
<td><strong>F.5 % of complaints</strong></td>
<td>Derived from the customer retention dimension of Mirzaei and Iyer (2014)</td>
<td></td>
</tr>
<tr>
<td><strong>F.6 % of loyal customers</strong></td>
<td>Derived from the customer retention dimension of Mirzaei and Iyer (2014)</td>
<td></td>
</tr>
<tr>
<td><strong>G.1 Total costs of Ownership (CRM)</strong></td>
<td>Derived from Ellram (1993)</td>
<td></td>
</tr>
<tr>
<td><strong>G.2 Sales revenue</strong></td>
<td>Derived from the findings of different articles (Baecke &amp; van den Poel, 2013; Bohanec et al., 2016; Kelly, 2000)</td>
<td></td>
</tr>
<tr>
<td><strong>G.3 Conversion rate (lead to order)</strong></td>
<td><strong>Self-developed</strong> based on the findings of different articles (Josiassen et al., 2014; Reinartz et al., 2004; Michael Rodriguez &amp; Honeycutt, 2011)</td>
<td></td>
</tr>
<tr>
<td><strong>G.4 Net profit margin</strong></td>
<td>Derived from the findings of different articles (Krasnikov et al., 2009; Rapp et al., 2010), <strong>specifically</strong> adopted from a <strong>measurement item</strong> of Coltman et al. (2011)</td>
<td></td>
</tr>
<tr>
<td><strong>G.5 Market share</strong></td>
<td>Derived from the findings of different articles (Kim et al., 2003; Long et al., 2013; Mithas et al., 2005; Zeynep Ata &amp; Toker, 2012), <strong>specifically</strong> adopted from a <strong>measurement item</strong> of Reinartz et al. (2004)</td>
<td></td>
</tr>
</tbody>
</table>
following section. Latent variables are all constructs that are not directly observable and therefore their measurement is ‘latent’. Within this research the constructs are measured with latent variables. For instances the evaluation of CRM planning and implementation, whereby the questionnaire asks for a dedicated change management or training programme. In both cases the respondent bases his answer on observations during the implementation and on other factors such as his personal mood on that day to which SEM refers as error variance. As these error variances should be minimised, it is key to have multiple indicators for the latent variable. These multiple indicators are summarised within a common factor model that must be defined for each concept, which were introduced in the previous section. All these variables have a cause and effect on the actual constructs as well as the error terms and the variables itself influence each other (Kline, 2015; Lomax & Schumacker, 2004; Sturgis, 2016).

Figure 5–6: Common Factor Model for CRM Planning and Implementation

![Common Factor Model for CRM Planning and Implementation](image)

Figure 5-5 shows how the construct of CRM planning and implementation, which is modelled within SEM using five operationalisation variables. In this example λ indicates the correlation between the construct (CRM planning and implementation) and the chosen variables. That means, if one of the indicators represent the construct strongly, λ would be close to 1. On the other side, if λ is closely to 0 the variable does not represent the construct well. Given the example of CRM planning and implementation, it becomes obvious why latent variables are beneficial for this research. First, the constructs are complex and multi-faceted and therefore single measures would not represent the complete complexity of the conceptual framework.
In other words, there is no independent correlation between CRM and BP but a mixture of direct (and indirect) effects which are influenced by measurement errors. These measurement errors can be reduced with SEM, as the construct includes multiple variables. With the support of path analysis, the regressions between the measured variables are not only shown as equations but within a standardised visualisation. These path ways illustrate the direct, indirect and total effects of the applied variables (Hair et al., 2019; Sturgis, 2016). Moreover, SEM does not only measure the single constructs (e.g. CRM implementation and planning) but also provides a structural model, which assesses the dependencies between these constructs. Also, SEM is used due to its possibility to model these complex dependencies and due to the fact, that it also models latent variables. In addition, SEM is dependent and built on a theoretical model and allows researchers to establish a measurement-model to evaluate correlations and regressions within their measurement and structural model. In conclusion, SEM is a powerful and flexible method to assess and analyse multi-faceted constructs and their relationships between each other (Kroehne et al., 2003). After having explained the SEM measurement, the next section concludes this chapter with a short summary.

5.11 Summary

First, this chapter has tackled the literature review methodology and ethical considerations by applying the ethical approval process of the university. Next, it has explained why this research follows a critical realism paradigm applying a mixed ontological and epistemological perspectives. The research reasoning has been explained as being deductive and an appropriate research methodology has been outlined based on Saunders research onion (Saunders et al., 2009). Afterwards the population and sample size has been precisely defined and the survey structure and questions were explained in detail. Lastly, questionnaire items have been introduced and the corresponding analysis and measurement model was presented. The next chapter illustrates the process of the data analysis, which serves as basis for the discussion of the findings in chapter 7.
6. Chapter – Findings

6.1 Introduction

This chapter covers all aspects around the data analysis from the online survey. The data was screened, and responses were analysed according to organisational and individual characteristics, based on the introduction questions of the survey. This analysis was conducted in excel. Afterwards SPSS 24 was used to analyse validity, reliability and identify mean values as well as standard deviations to test normality and linearity of the data. Afterwards AMOS was used to perform the confirmatory factor analysis (CFA) as well as the structural equation modelling (SEM). Hereby two measurement models will be introduced to measure CRM and BP. Next, the results of Harman’s Single Factor test (SPSS) and common factor analysis (AMOS) are introduced to test against common method bias. Afterwards, three structural research models are developed to test hypotheses. After testing the derived hypotheses from section 4.3, two additional model variations are presented to examine differences in the data according to organisational size and ownership.
6.2 Demographic profile of the participated organisations

Prior to the analysis of organisational and individual characteristics, a basic data screening was done. As the survey was designed to be completed by 100% no empty responses were identified. However, looking at the introduction questions, some invalid values have been identified. Q.5 asks for the city of the organisations and 8 responses did not provide an existing city. Q.11 asks which CRM system is in place and 16 responses did not provide an existing CRM system even though they did not provide the answer ‘don’t know’. Q.14 asks for the position of the respondent in his/her organisation and 32 responses did not indicate an existing job position. Combining these three areas of non-valid answers, within the introduction section two responses are affected from invalid answers of Q.5, Q.11 and Q.14. These invalid answers are highlighted in the initial analysis but will not be excluded as their answers within the CRM and BP section are valid and complete. The following charts characterise the data with regards to the organisational attributes of the respondents.

Figure 6—1: Number of employees (Q1)

Within the range of 250 – 999 employees, the majority of responses are from organisations with less than 1.000 employees (55.20 %). This also reflects the share on German B2B organisations in general quite well, as many organisations are rather small sized. Within the data, only 11% are quite large organisations with more than 5.000 employees.
Looking at the annual turnover as size indicator, the data is well distributed. While only 17.20% are generating a turnover of maximum 5m€, most organisations are generating turnover between 5m€ and 100m€. This range can again be classified as ‘typical for large German B2B organisations while the residual 31.80 % are major industrial enterprises with an annual turnover up to 1bn€ and more. For 8.60% no valid data was given.
Asking for the number of CRM users gives a clear picture about the usage of CRM within that organisations. Most organisations have less than 500 Users (76.60 %) which is a big amount of CRM users, assuming that CRM is mostly used in sales departments but seldom in customer service or field service. Hence it can be indicated, that the participated organisations have a good penetration of CRM usage within their (sales) departments. On the other side, only 17.20 % of the organisations are ‘heavy’ CRM organisations, as more than 500 users are working with CRM.
The distribution of affected industries is high within the data. Due to this high distribution, 17% (or 87 responses) were summarised as others and reflect the highest proportion. The top three industries are represented by It-Services (11%), Wholesales (8%) and Engineering and Manufacturing (7%).
Within the definition of German large organisations, the question occurred, whether the ownership of an organisation plays a major role. From a practical perspective, it does. The German B2B industry is characterised by many family-owned organisations. Within the data this characteristic applies for 37% or 188 organisations.
Lastly, the usage of CRM in years gives a heterogeneous picture about how long organisations are working with CRM. Hereby, CRM can be understood as software or as company philosophy which explains the variety in the data. Splitting it into two groups 60% indicated, that they use CRM for more than 10 years, which can be understood as customer-oriented organisation and/or first mover when it comes to the usage of CRM-software. 40% are using it less than 10 years. Hence, it can be interpreted that customer orientation is not their primary focus, but they might be focusing on other drivers such as product innovation or regulations.
6.3 Analysis of the participated respondents

After having characterised the participated organisations, this section investigates the employees who gave the answers for their organisation.

Figure 6—7: Years of CRM experience (Q2)

First, the years of CRM experience shows, that most of the respondents are very experienced with more than 7 years of experience (63.80%). Only 12% are quite new to the area of CRM and the residual 24.20% are working with CRM between 4 and 6 years. Again, all employees who indicate that they have more than 25 years of experience, may refer to CRM as a concept but not primarily as a standardised software as this occurred in the early 1990s.
Similarly, to the industry of the affected organisations, the department of the respondents are also well distributed. However, a major proportion is working in IT or Sales (49%) which makes sense, as they either consult or maintain the CRM software in IT or they are a user in the sales department. Interestingly many other departments such as, management (8%) or finance and controlling (7%) are more represented than other possible CRM departments (i.e. marketing or customer service).
Lastly, the position of the respondents shows that 64% of the respondents are having leadership responsibilities (i.e. working as team-lead or middle-management). Only 17% are employees without any leadership or management responsibilities and top management is represented with 19% (i.e. Senior Management, C-Level, MD or Partners). This shows, that the data is generated by major decision makers.

After having analysed the data from an organisational and employee perspective, the next section covers a descriptive analysis of the constructs itself and their items.
6.4 Descriptive and normality analysis of CRM and BP

6.4.1 Introduction

The following sections analyse all constructs and items of CRM and BP. Thereby this section is divided into three parts. First, a very basic descriptive analysis discusses Mean, SD, Median and Variance. Afterwards the focus is set on the analysis of skewness, kurtosis and the correlations of the items within the constructs. Lastly, the factor loadings are discussed and will be used as transition to the CFA analysis in section 6.5. Both sections (6.4 and 6.5) are divided into two parts covering CRM and BP separately. To discuss the results, the analysis metrics are shortly introduced for each part of the analysis including statistical threshold where applicable:

Part 1 – Basic descriptive analysis (Pallant, 2007; Saunders et al., 2009):

- **Mean** describes the average response for one questionnaire item.
- **Standard deviation** (SD) describes the dispersion of the answers from the mean value.
- **Median** describes the middle value of all answers but does not indicate the mean.
- **Variance** describes the variability of the answers from the arithmetic mean value as squared deviation.

Part 2 – Normality analysis

- **Skewness** measures the symmetry of the data set, i.e. its distribution from the central (mean point). The symmetry fits, if the data is equally distributed on the right and left side of the mean. For the analysis a range between -1 and +1 will be considered as acceptable (Hair et al., 2019; Marcoulides & Saunders, 2006; Pallant, 2007; Thode, 2002).
- **Kurtosis** indicates how the data is tailed, i.e. its outliers to the normal distribution. High kurtosis indicates a lot of outliers, while low kurtosis shows little outliers. For the analysis a range between -1.96 and +1.96 will be considered as acceptable on a .05 error level (Hair et al., 2019; Marcoulides & Saunders, 2006; Pallant, 2007; Thode, 2002).
• **Correlations**(1. – 5.) describe the association between the constructs, i.e. if two constructs highly correlate, they have an equal behaviour. Correlations can be positive (if one item increases, the other will increase as well) or negative (if one item increases, the other will decrease) (Pallant, 2007; Saunders et al., 2009).

**Part 3 – Factor loadings**

• **Factor loadings** are important for the CFA in the next section and describe the correlation between the items and its construct. In other words, if the factor loadings are high, the items represent a high degree of the construct and the item can be considered as reliable measure for this construct. Factor loadings are also used to calculate other statistical metrics such as average variance extracted (AVE) in the next chapter. Factor loadings should be generally 0.50 or higher, preferably 0.70 (Brown, 2006; Hair et al., 2019).

After having introduced the analysis metrics, the following sections will shortly discuss the results and indicate the consequences for the further data analysis.

**6.4.2 Constructs and items of CRM**

**Part 1 – Basic descriptive analysis:**

The mean values of all CRM items vary between 4.76 and 5.18 while the SD varies between 1.52 and 1.72 which shows that the answers are not widely dispersed from the mean value (variance varies between 2.32 and 2.97). Lastly, the mean values are mostly at 5 (slightly agree) with some (A.1, C.2.1, D.5) being at 6 (strongly agree).

**Part 2 – Normality analysis**

The normality assessment of the CRM items shows a very small distribution of the data in terms of skewness and kurtosis. In specific, all skewness values are negative (between -0.63 and -0.94) but higher than the threshold of -1, expect for item D.5 which shows a skewness value of -1.03. Consequently, it can be said, that the data is moderately negatively skewed which means, that the peak is lower than the average which means that there is a slight disagreement on the CRM scale compared to the mean.

Looking at kurtosis the data shows that all items are very close to 0, some with a positive and some with a negative kurtosis value between -0.48 and 0.56. As this is far away from the
relevant thresholds it can be said that very little outliers exist, and the data is close to normal distribution. Looking at the correlations overall, it can be summarised, that all correlations are positive. That means that the constructs move in tandem. Overall, the correlations are between 0.54 and 0.77. As the correlations will be discussed within CFA in more detail, no further or more detailed analysis will be made at this stage.

Part 3 – Factor loadings

Lastly, the factor loadings are being analysed with the optimum threshold being 0.70. Luckily, all factor loadings within the CRM constructs are above 0.70, specifically between 0.73 and 0.87. Hence, all items can be considered as being relevant for the corresponding CRM constructs.

Finally, Table 6-1 summarises the findings from the analysis which have been discussed in the previous paragraphs.

Table 6-1: Descriptive and normality analysis of CRM constructs & items

<table>
<thead>
<tr>
<th>Constructs &amp; items of BP</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Variance</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) CRM Strategy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Customer groups</td>
<td>5.07</td>
<td>1.724</td>
<td>6.00</td>
<td>2.971</td>
<td>-0.931</td>
<td>-0.113</td>
<td>0.795</td>
</tr>
<tr>
<td>2. Sales Channels</td>
<td>5.04</td>
<td>1.652</td>
<td>5.00</td>
<td>2.730</td>
<td>-0.929</td>
<td>-0.077</td>
<td>0.810</td>
</tr>
<tr>
<td>3. Up-to-date IT</td>
<td>4.79</td>
<td>1.698</td>
<td>5.00</td>
<td>2.882</td>
<td>-0.925</td>
<td>-0.479</td>
<td>0.806</td>
</tr>
<tr>
<td>4. Customer Feedback</td>
<td>4.95</td>
<td>1.870</td>
<td>5.00</td>
<td>2.789</td>
<td>-0.783</td>
<td>-0.151</td>
<td>0.799</td>
</tr>
<tr>
<td>5. Business Strategy Vision</td>
<td>4.91</td>
<td>1.522</td>
<td>5.00</td>
<td>2.316</td>
<td>-0.148</td>
<td>0.000</td>
<td>0.722</td>
</tr>
<tr>
<td>(B) CRM Planning and Implementation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Process to define requirements</td>
<td>5.08</td>
<td>1.821</td>
<td>5.00</td>
<td>2.378</td>
<td>-0.839</td>
<td>-0.106</td>
<td>0.822</td>
</tr>
<tr>
<td>2. Training programme</td>
<td>4.86</td>
<td>1.625</td>
<td>5.00</td>
<td>2.511</td>
<td>-0.829</td>
<td>-0.213</td>
<td>0.823</td>
</tr>
<tr>
<td>3. Change Management programme</td>
<td>4.91</td>
<td>1.657</td>
<td>5.00</td>
<td>2.342</td>
<td>-0.984</td>
<td>0.244</td>
<td>0.823</td>
</tr>
<tr>
<td>4. Customer Support</td>
<td>4.76</td>
<td>1.642</td>
<td>5.00</td>
<td>2.477</td>
<td>-0.984</td>
<td>0.244</td>
<td>0.823</td>
</tr>
<tr>
<td>5. Project management</td>
<td>5.10</td>
<td>1.531</td>
<td>5.00</td>
<td>2.543</td>
<td>-0.943</td>
<td>0.166</td>
<td>0.820</td>
</tr>
<tr>
<td>(C.1) Analytical CRM – Technologies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Clustering</td>
<td>4.96</td>
<td>1.576</td>
<td>5.00</td>
<td>2.483</td>
<td>-0.795</td>
<td>-0.047</td>
<td>0.796</td>
</tr>
<tr>
<td>2. Forecasting</td>
<td>5.00</td>
<td>1.575</td>
<td>5.00</td>
<td>2.488</td>
<td>-0.971</td>
<td>-0.156</td>
<td>0.850</td>
</tr>
<tr>
<td>3. Forecasting</td>
<td>5.10</td>
<td>1.530</td>
<td>5.00</td>
<td>2.463</td>
<td>-0.964</td>
<td>-0.213</td>
<td>0.850</td>
</tr>
<tr>
<td>4. Data visualization</td>
<td>5.16</td>
<td>1.610</td>
<td>5.00</td>
<td>2.582</td>
<td>-0.868</td>
<td>-0.396</td>
<td>0.850</td>
</tr>
<tr>
<td>5. Predictive analytics</td>
<td>4.91</td>
<td>1.616</td>
<td>5.00</td>
<td>2.477</td>
<td>-0.984</td>
<td>0.244</td>
<td>0.823</td>
</tr>
<tr>
<td>(C.2) Analytical CRM – Usage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Sales revenue</td>
<td>5.27</td>
<td>1.811</td>
<td>6.00</td>
<td>2.964</td>
<td>-0.861</td>
<td>0.334</td>
<td>0.787</td>
</tr>
<tr>
<td>2. Marketing campaigns</td>
<td>4.92</td>
<td>1.592</td>
<td>5.00</td>
<td>2.567</td>
<td>-0.961</td>
<td>-0.156</td>
<td>0.793</td>
</tr>
<tr>
<td>3. Customer activities</td>
<td>5.21</td>
<td>1.544</td>
<td>5.00</td>
<td>2.385</td>
<td>-0.906</td>
<td>-0.486</td>
<td>0.823</td>
</tr>
<tr>
<td>4. Customer loyalty</td>
<td>4.99</td>
<td>1.584</td>
<td>5.00</td>
<td>2.789</td>
<td>-0.859</td>
<td>-0.213</td>
<td>0.844</td>
</tr>
<tr>
<td>5. Cross- and up-selling</td>
<td>5.00</td>
<td>1.641</td>
<td>5.00</td>
<td>2.793</td>
<td>-0.811</td>
<td>0.084</td>
<td>0.801</td>
</tr>
<tr>
<td>6. Reasons for customer complaints</td>
<td>5.01</td>
<td>1.575</td>
<td>5.00</td>
<td>2.797</td>
<td>-0.888</td>
<td>-0.144</td>
<td>0.818</td>
</tr>
<tr>
<td>(D) CRM Success measurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Implementation/ non-operating costs</td>
<td>4.78</td>
<td>1.651</td>
<td>5.00</td>
<td>2.727</td>
<td>-0.834</td>
<td>-0.31</td>
<td>0.757</td>
</tr>
<tr>
<td>2. System operating costs</td>
<td>5.16</td>
<td>1.582</td>
<td>5.00</td>
<td>2.441</td>
<td>-0.939</td>
<td>0.46</td>
<td>0.917</td>
</tr>
<tr>
<td>3. Internal improvements</td>
<td>4.52</td>
<td>1.628</td>
<td>5.00</td>
<td>2.586</td>
<td>-0.904</td>
<td>-0.213</td>
<td>0.877</td>
</tr>
<tr>
<td>4. External improvements</td>
<td>5.01</td>
<td>1.589</td>
<td>5.00</td>
<td>2.517</td>
<td>-0.926</td>
<td>0.234</td>
<td>0.860</td>
</tr>
<tr>
<td>5. Financial improvements</td>
<td>5.18</td>
<td>1.586</td>
<td>6.00</td>
<td>2.551</td>
<td>-1.087</td>
<td>0.590</td>
<td>0.841</td>
</tr>
</tbody>
</table>

6.4.3 Constructs and items of BP

Part 1 – Basic descriptive analysis:

The mean values of all BP items vary between 6.39 and 7.02 while the SD varies between 1.64 and 2.02 which shows that the answers are more dispersed from the mean value (variance...
varies between 2.70 and 4.09). Considering the 10-point scale (instead of 7-point scale for CRM) this dispersion can be accepted. Lastly, the mean values are mostly at 7 with one exception (F.5) being at 6.

**Part 2 – Normality analysis**

The normality assessment of the CRM items shows a very small distribution of the data in terms of skewness and kurtosis. In specific, all skewness values are negative (between -0.10 and -0.49) but higher than the threshold of -1. Consequently, it can be said that the data is moderately negatively skewed which means, that the peak is lower than the average which means that there is a slightly lower performance estimation on the BP scale compared to the mean. Looking at kurtosis the data shows that all items are very close to 0, some with a positive and some with a negative kurtosis value between -0.59 and 0.29. As this is far away from the relevant thresholds it can be said, that very little outliers exist, and the data is close to normal distribution.

Looking at the correlations overall, it can be summarised, that all correlations are positive. That means that the items move in tandem within their constructs. Overall, the correlations are between 0.40 and 0.65. As the correlations will be discussed within CFA in more detail, no further or more detailed analysis will be made at this stage.

**Part 3 – Factor loadings**

Lastly, the factor loadings are being analysed with the optimum threshold being 0.70. All factor loadings within the BP constructs are above 0.70, specifically between 0.72 and 0.78 besides one exception. Item D.5 shows a factor loading of 0.58 and therefore still is above 0.50, which can be accepted even though it is not above the ideal threshold of 0.70. Hence, all items can be considered as being relevant for the corresponding BP constructs.

Finally, table 6-2 summarises the findings from the analysis which have been discussed in the previous paragraphs.
After having analysed all constructs and the corresponding items for CRM and BP, the next section investigates the reliability and validity of the CRM and BP as model using confirmative factor analysis.

6.5 Analysis of reliability and validity

6.5.1 Introduction

After having analysed all items, this section analyses the constructs of the CRM and BP model. Therefore, the analysis is divided into four parts. Part one looks at the statistical significance as well as at the normality of the data using Kolmogorov-Smirnov (KS) analysis. Part two investigates the construct validity and construct reliability. Finally, part three includes a confirmative factor analysis (CFA) and a model fit analysis. All necessary key indicators and their relevant thresholds are introduced in the following:

Part 1 – Statistical significance and normality

- The p-value represents the value of probability. In other words, it shows if a result occurred randomly or if it is statistically significant. To do so, the level (alpha) of statistical significances must be defined prior to the analysis. This survey aims to have a 95% confidence level, which means that alpha equals 0.05. Alpha can also be described as the area of ‘allowed’ data. That means, that the periphery of the data (i.e. the upper and lower 2.5%) can be neglected. Within this research, p-value will be analysed and all items above 0.05 will be excluded as they are statistically not significant (Hair et al., 2019; Pallant, 2007; Saunders et al., 2009).
• In addition to the skewness and kurtosis test of the single items for each construct, the Kolmogorov-Smirnov test was performed for both constructs. It measures, if the distribution of the constructs (for CRM and BP) can be considered as normal compared to the expected distribution and thereby compares the overall shape of the distribution, and not the specific shape as with skewness or kurtosis testing (Hair et al., 2019; Thode, 2002).

Part 2 - Construct validity & reliability:

Measuring the construct validity is crucial, as it confirms weather the designed construct measures what it should measure, i.e. if the items which were derived from the theory are measuring the latent constructs within the model. Validity can be divided into two sub-concepts. Convergent validity represents the share of which items of a construct share a high proportion of variance and can be tested with factor loadings and the average variance extracted (AVE). Discriminant validity represents the share to which a construct is truly unique (i.e. distinct) of another construct and can be tested with the Squared Inter-Construct Correlations (SIC) and the AVE. After having investigated validity, it is equally important to measure the constructs reliability, to ensure that the latent construct is consistent and represented by the ‘right’ items. To perform these measurements, the following indicators are tested (Brown, 2006; Fornell & Larcker, 1981; Hair et al., 2019; Marbach et al., 2016):

• Factor loadings of the single items should be higher than 0.5 to ensure convergent validity (see previous section).
• Construct reliability should be higher than 0.7 using both Cronbach’s Alpha (α) and composite reliability (CR), both being a measure for internal consistency of the data.
• The AVE– which measures the amount of variance which is captured by the model compared to the amount of variance due to the measurement error - should be higher than 0.5 to ensure convergent validity.
• The SIC should be smaller than the AVE to achieve discriminant validity.

Part 3 – Confirmative factor analysis & model fit:
After having introduced the reliability and validity measures, part 3 covers the confirmative factor analysis (CFA). CFA in general tests how well the measurement theory can be used based on the specific data, i.e. the observed items per construct. Thereby the so-called model fit is being analysed. Assessing the model fit is important to ensure, that the defined model (which is based on theoretical research) can reproduce measurable results with the proposed items for each construct. To do so, the following indices are used while performing the CFA and testing the model fit (Brown, 2006; Hair et al., 2019; Hooper et al., 2008; Marbach et al., 2016):

- Chi-square ($\chi^2$) is measures the magnitude of difference between the sample and the fitted covariance matrices. Due to the large sample size this measure is ignored, as it should not be applied to assess good fit. However, for the purpose of completion, it is reported.
- Goodness of Fit-Index (GFI) measures the fit between the theory-based model and the observed (covariance matrix) data and should be greater than 0.90.
- Root Mean Square Error of Approximation (RMSEA) analyses the discrepancy between the theory-based model, with ideal chosen parameter estimates, and the population covariance matrix. It should be between 0.03 and 0.08 to achieve good fit.
- Normed Fit Index (NFI) measures the difference between the chi-squared value of the theory-model and the chi-squared value of the null model. It should be greater than 0.90 to achieve good fit.
- Comparative Fit Index (CFI) measures the difference between the data and the theory-model (like the NFI) but is considering and adjusting for the sample size and should be greater than 0.90.
- Standardised Root Mean Residual (SRMR) is a standardized measure of badness of fit analysing the difference between the observed and predicted correlation. Hence it should ideally be below 0.1.

After having introduced the key indices to analyse the constructs, the following two sections will represent the results for the CRM and BP model discussing the data analysis of CFA and its model fit indices.
6.5.2 Initial CFA and Model fit of CRM

This section analyses the CRM constructs. Firstly, none missing cases were identified and all answers are qualified as valid. Moreover, the data shows that all correlations are significant at the 0.01 level with Sig. (2-tailed) being at 0.000 for all sub-constructs of CRM. Equally, the Test of normality (KS) shows a significance of 0.000 for all latent constructs.

Secondly, validity and reliability have been tested. As shown in chapter 6.4.1 all factor loadings are above 0.5. In addition, the AVE shows a value of higher than 0.5 for all latent constructs (being between 0.62 and 0.68). Consequently, convergent validity can be confirmed. Looking at the discriminant validity, SICs are compared with the AVE. Discriminant validity is fully achieved for A and B but not completely for C.1 (SIC with C.2 equals 0.64 > AVE 0.62), for C.2 (SIC with D equals 0.70 > AVE 0.64) and for D (SIC with C.2 equals 0.68 > AVE 0.64).

Investigating construct reliability, Cronbach’s alpha and composite reliability scores are above 0.7 and therefore reliability is confirmed. In specific, Cronbach’s alpha scores vary between 0.89 and 0.92 while CR scores vary between 0.72 and 0.82. Table 6-3 summarises the scores for the CRM construct.

### Table 6-3: Summary of validity and reliability analysis for CRM

<table>
<thead>
<tr>
<th>Customer Relationship Management</th>
<th>Mean</th>
<th>SD</th>
<th>Sig. (2-tailed)</th>
<th>Valid Cases / Missing Cases</th>
<th>Test of Normality / KS (Sig.)</th>
<th>α</th>
<th>CR</th>
<th>AVE (A)</th>
<th>(B)</th>
<th>(C.1)</th>
<th>(C.2)</th>
<th>(D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: CRM Strategy</td>
<td>4.97</td>
<td>1.65</td>
<td>0.000</td>
<td>100/5/16/16/00</td>
<td>0.000</td>
<td>0.89</td>
<td>0.74</td>
<td>0.63</td>
<td>0.61</td>
<td>0.54</td>
<td>0.50</td>
<td>0.44</td>
</tr>
<tr>
<td>B: CRM Planning and Implementation</td>
<td>5.00</td>
<td>1.55</td>
<td>0.000</td>
<td>100/5/16/16/00</td>
<td>0.000</td>
<td>0.92</td>
<td>0.82</td>
<td>0.68</td>
<td>0.78</td>
<td>0.60</td>
<td>0.59</td>
<td>0.58</td>
</tr>
<tr>
<td>C.1: Analytical CRM - Technologies</td>
<td>4.97</td>
<td>1.65</td>
<td>0.000</td>
<td>100/5/16/16/00</td>
<td>0.000</td>
<td>0.89</td>
<td>0.72</td>
<td>0.64</td>
<td>0.73</td>
<td>0.77</td>
<td>0.64</td>
<td>0.60</td>
</tr>
<tr>
<td>C.2: Analytical CRM - Usage</td>
<td>5.07</td>
<td>1.64</td>
<td>0.000</td>
<td>100/5/16/16/00</td>
<td>0.000</td>
<td>0.91</td>
<td>0.76</td>
<td>0.64</td>
<td>0.71</td>
<td>0.77</td>
<td>0.70</td>
<td>0.78</td>
</tr>
<tr>
<td>D: CRM Success measurement</td>
<td>5.01</td>
<td>1.61</td>
<td>0.000</td>
<td>100/5/16/16/00</td>
<td>0.000</td>
<td>0.91</td>
<td>0.82</td>
<td>0.66</td>
<td>0.77</td>
<td>0.77</td>
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</tbody>
</table>

Thirdly, and lastly the CFA and model fit indices are tested. Figure 6-10 shows the measurement model of all CRM constructs. Based in this initial model, the relevant model fit indices are report as follows:

- $\chi^2$ was measured with 1120.80
- GFI score shows 0.84 and is below the ideal value of 0.90
- NFI score shows 0.90 and is equal to the ideal value of 0.90
- CFI score shows 0.92 and is above the ideal value of 0.90
- RMSEA score shows 0.76 and is not within the ideal range of 0.03 - 0.08
In conclusion 2 out of 5 model fit indices (GFI and RMSEA) are negative, so that the model cannot be confirmed as useful measurement model and must be adjusted. For this reason, SRMR was not tested in the initial model. Hence, the model has been adjusted to achieve greater model fit. To do so, three iterations and thereby the following exclusions have been made:

- **Initial Model**: All items are included
- Revised Model (V1): A.4, A.5, C.1.1., C.1.2, C.2.2, D.1 were excluded
- Revised Model (V2): No changes within the CRM construct (but within BP)
- Revised Model (V3): D.2 and C.2.1 were excluded

These three iterations result in the final version 3 of the CFA for CRM, which is presented in the next section. All iterations can be seen in appendices 10 – 13, presenting all details regarding model fit indices as well as the actual model from AMOS. Thereby the reasons for exclusion are transparent as well.
### 6.5.3 Final CFA and Model fit of CRM

After having tested the initial model (see appendix 10) the iterations led to a final model, which achieves validity and reliability as well as good model fit indices. To do so, version one excluded A.4, A.5, C.1.1, C.1.2, C.2.2 and D1 were excluded, as the analysis resulted in some discriminant validity issues (see appendix 11) and their factor loadings were the lowest (all below 0.77). In version two no changes have been made within the CRM model but within the BP model. Version three excluded D.2 and C.2.1 (both with the lowest factor loadings of 0.78) to lower the SIC between C.2 and D and thereby converge with the AVE of C.2 as this remains the only critical issue in version two to achieve discriminant validity.

Overall, validity and reliability has been tested, as in the initial model. As shown in chapter 6.4.1 all factor loadings are above 0.5. In addition, the AVE shows a value of higher than 0.05 for all latent constructs (being between 0.66 and 0.75). Consequently, convergent validity can be confirmed. Looking at the discriminant validity, SICs are compared with the AVE. Discriminant validity is fully achieved for A, B, C.1 and C.2. For D discriminant validity can also be confirmed, as AVE and SIC are equal at 0.66 in version three, due to the exclusion of D.2 and C.2.1. Investigating construct reliability, Cronbach’s alpha and composite reliability scores are above 0.7 and therefore reliability is confirmed. In specific, Cronbach’s alpha scores vary between 0.86 and 0.92 while CR scores vary between 0.80 and 0.90. Table 6-4 summarises the scores for the CRM construct.

<table>
<thead>
<tr>
<th>Customer Relationship Management</th>
<th>Mean</th>
<th>SD</th>
<th>Sig. (2-tailed)</th>
<th>Valid Cases</th>
<th>Missing Cases</th>
<th>Test of Normality</th>
<th>KS (Sig.)</th>
<th>CR</th>
<th>AVE</th>
<th>(A)</th>
<th>(B)</th>
<th>(C.1)</th>
<th>(C.2)</th>
<th>(D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRM Strategy</td>
<td>4.97</td>
<td>1.69</td>
<td>0.00</td>
<td>100%</td>
<td>0%</td>
<td>0.00</td>
<td>0.86</td>
<td>0.81</td>
<td>0.67</td>
<td>0.55</td>
<td>0.38</td>
<td>0.41</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>CRM Planning and Implementation</td>
<td>5.00</td>
<td>1.56</td>
<td>0.00</td>
<td>100%</td>
<td>0%</td>
<td>0.00</td>
<td>0.92</td>
<td>0.83</td>
<td>0.69</td>
<td>0.74</td>
<td>0.51</td>
<td>0.57</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>Analytical CRM - Technologies</td>
<td>4.94</td>
<td>1.62</td>
<td>0.00</td>
<td>100%</td>
<td>0%</td>
<td>0.00</td>
<td>0.88</td>
<td>0.87</td>
<td>0.72</td>
<td>0.61</td>
<td>0.72</td>
<td>0.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analytical CRM - Usage</td>
<td>4.04</td>
<td>1.30</td>
<td>0.00</td>
<td>100%</td>
<td>0%</td>
<td>0.00</td>
<td>0.89</td>
<td>0.80</td>
<td>0.66</td>
<td>0.64</td>
<td>0.75</td>
<td>0.74</td>
<td>0.66</td>
<td></td>
</tr>
<tr>
<td>CRM Success measurement</td>
<td>5.04</td>
<td>1.61</td>
<td>0.00</td>
<td>100%</td>
<td>0%</td>
<td>0.00</td>
<td>0.90</td>
<td>0.90</td>
<td>0.75</td>
<td>0.59</td>
<td>0.75</td>
<td>0.73</td>
<td>0.81</td>
<td></td>
</tr>
</tbody>
</table>

Thirdly, and lastly the CFA and model fit indices are tested. Figure 6-11 shows the measurement model of all CRM constructs. Based in this final model (Version 3), the relevant model fit indices are report as follows:

---

6 The final CFA and Model fit refers to version 3 (see appendix)
• $\chi^2$ was measured with 426.10
• GFI score shows 0.91 and is above the ideal value of 0.90
• NFI score shows 0.94 and is above the ideal value of 0.90
• CFI score shows 0.96 and is above the ideal value of 0.90
• RMSEA score shows 0.07 and is within the ideal range of 0.03 - 0.08
• SRMR score shows 0.04 and is below the ideal value of 0.1

In conclusion, all 5 model fit indices are positive, so that the model can be confirmed as a useful measurement model for CRM. The following section continues with the BP model and its constructs.
6.5.4 Initial CFA and Model fit of BP

This section analyses the BP constructs. Firstly, none missing cases were identified and all answers are qualified as valid. Moreover, the data shows that all correlations are significant at the 0.01 level with Sig. (2-tailed) being at 0.000 for all sub-constructs of BP. Equally, the Test of normality (KS) shows a significance of 0.000 for all latent constructs.

Secondly, validity and reliability has been tested. As shown in chapter 6.4.2 all factor loadings are above 0.5. In addition, the AVE shows a value of higher than 0.5 for all latent constructs (being between 0.53 and 0.59). Consequently, convergent validity can be confirmed. Looking at the discriminant validity, SIC is being compared with the AVE. Discriminant validity is not achieved for E, F and G as the SIC values are greater than the measured AVE score. Investigating construct reliability, Cronbach’s alpha scores are above 0.7 but composite reliability scores are below 0.7. In specific, Cronbach’s alpha scores vary between 0.87 and 0.88 while CR scores vary between 0.56 and 0.67. Consequently, reliability can be confirmed only partly. Table 6-5 summarises the scores for the CRM construct.

Table 6-5: Summary of validity and reliability analysis for BP

<table>
<thead>
<tr>
<th>Business Performance</th>
<th>Mean</th>
<th>SD</th>
<th>Sig. (2-tailed)</th>
<th>Valid Cases / Missing Cases</th>
<th>Test of Normality / KS (Sig.)</th>
<th>α</th>
<th>CR</th>
<th>AVE (E)</th>
<th>(F)</th>
<th>(G)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(E) Internal business processes</td>
<td>6.85</td>
<td>1.79</td>
<td>0.000</td>
<td>100% / 0%</td>
<td>0.000</td>
<td>0.87</td>
<td>0.60</td>
<td>0.55</td>
<td>-</td>
<td>0.57</td>
</tr>
<tr>
<td>(F) External customer satisfaction</td>
<td>6.82</td>
<td>1.83</td>
<td>0.000</td>
<td>100% / 0%</td>
<td>0.000</td>
<td>0.87</td>
<td>0.66</td>
<td>0.53</td>
<td>0.76</td>
<td>0.82</td>
</tr>
<tr>
<td>(G) Financial performance</td>
<td>6.82</td>
<td>1.78</td>
<td>0.000</td>
<td>100% / 0%</td>
<td>0.000</td>
<td>0.88</td>
<td>0.67</td>
<td>0.59</td>
<td>0.76</td>
<td>0.79</td>
</tr>
</tbody>
</table>

Thirdly, and lastly the CFA and model fit indices are tested. Figure 6-12 shows the measurement model of all BP constructs. Based in this initial model, the relevant model fit indices are report as follows:

- $\chi^2$ was measured with 281.40
- GFI score shows 0.94 and is above the ideal value of 0.90
- NFI score shows 0.94 and is above the ideal value of 0.90
- CFI score shows 0.97 and is above the ideal value of 0.90
- RMSEA score shows 0.05 and is within the ideal range of 0.03 - 0.08
In conclusion, all model fit indices are positive. However, discriminant validity cannot be confirmed and reliability only partly. For these reasons, the model must be adjusted. To do so, three iterations and thereby the following exclusions have been made:

- **Initial Model**: All items are included
- Revised Model (V1): E.6 and F.5 were excluded
- Revised Model (V2): E.5, F.1 and G.1 were excluded
- Revised Model (V3): E.2 and F.4 were excluded

These three iterations result in the final version 3 of the CFA for BP, which is presented in the next section. All iterations can be seen in appendix 10 – 13, presenting all details regarding model fit indices as well as the actual model from AMOS. Thereby the reasons for exclusion are transparent as well.
6.5.5 Final7 CFA and Model fit of BP

After having tested the initial model (see appendix 10) the iterations led to a final model, which achieves validity and reliability as well as good model fit indices. To do so, version one and two excluded the items with the lowest factor loadings (e.g. in version one below 0.7) to achieve better discriminant validity and improve CR (i.e. reliability).

After that, validity and reliability have been tested again, as in the initial model. As shown in chapter 6.4.1 all factor loadings are above 0.5. In addition, the AVE shows a value of higher than 0.5 for all latent constructs (being between 0.57 and 0.60). Consequently, convergent validity can be confirmed. Looking at the discriminant validity, SICs are compared with the AVE. Discriminant validity is fully achieved E, F and G, due to the exclusion mentioned above, which resulted in SICs < AVE for all constructs.

Investigating construct reliability, Cronbach’s alpha scores are all above 0.7. In specific they vary between 0.80 and 0.86. Moreover, CR scores have improved in version three of the model, but they are still not completely above 0.7. In specific they vary between 0.64 and 0.70. Hence, formal reliability cannot be fully confirmed, as 2 out of 3 CR values below the ideal threshold of 0.7. However, researchers are debating about the hard cut-off on a specific value of 0.7 and see a CR value of 0.65 still as minimal acceptable (Bollen, 1989; Cronbach & Shavelson, 2004).

For instances, Sridharan et al. (2010) are using a lower thresholds of only 0.5 in their research regarding modelling e-learning effects. In conclusion reliability can still be confirmed, as all CR values are very close at the minimal acceptable value of 0.65 and Cronbach alpha scores are above the ideal of 0.8. Table 6-6 summarises the scores for the BP construct.

Table 6-6: Summary of validity and reliability analysis for CRM

<table>
<thead>
<tr>
<th>Business Performance</th>
<th>Mean</th>
<th>SD</th>
<th>Sig. (2-tailed)</th>
<th>Valid Cases / Missing Cases</th>
<th>Test of Normality / K-S (Sig.)</th>
<th>CR</th>
<th>AVE</th>
<th>(E)</th>
<th>(F)</th>
<th>(G)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(E) Internal business processes</td>
<td>5.17</td>
<td>1.32</td>
<td>0.00</td>
<td>100% / 0%</td>
<td>0.00</td>
<td>0.80</td>
<td>0.64</td>
<td>0.57</td>
<td>-0.51</td>
<td>0.47</td>
</tr>
<tr>
<td>(F) External customer satisfaction</td>
<td>6.89</td>
<td>1.80</td>
<td>0.00</td>
<td>100% / 0%</td>
<td>0.00</td>
<td>0.81</td>
<td>0.65</td>
<td>0.58</td>
<td>0.71</td>
<td>-0.56</td>
</tr>
<tr>
<td>(G) Financial performance</td>
<td>6.86</td>
<td>1.77</td>
<td>0.00</td>
<td>100% / 0%</td>
<td>0.00</td>
<td>0.86</td>
<td>0.70</td>
<td>0.60</td>
<td>0.69</td>
<td>0.75</td>
</tr>
</tbody>
</table>

Thirdly, and lastly the CFA and model fit indices are tested. Figure 6-13 shows the measurement model of all BP constructs. Based on this final model (Version 3), the relevant model fit indices are report as follows:

---

7 The final CFA and Model fit refers to version 3 (see appendix)
• χ² was measured with 88.52
• GFI score shows 0.97 and is above the ideal value of 0.90
• NFI score shows 0.97 and is above the ideal value of 0.90
• CFI score shows 0.98 and is above the ideal value of 0.90
• RMSEA score shows 0.06 and is within the ideal range of 0.03 - 0.08
• SRMR score shows 0.03 and is below the ideal value of 0.1

In conclusion, all model fit indices are very positive, so that the model can be confirmed as very useful measurement model for BP.
6.6 Common Method Bias

After having analysed the CRM and BP model this section discusses common method bias. Hereby, common method bias will be tested for the CRM and BP model as well as for the measurement model, which combines all CRM and BP measures (see next section). As all models use a similar scale, this test ensures that the results are not influenced by the measuring instrument itself. Therefore, Harman’s single-factor test was conducted in SPSS and a common factor was added to the research model in AMOS. The Harman’s single factor indicates a common method bias, if one single factor accounts for more than 50% of the whole research model.

For the CRM model, the test shows 17 of 18 factors with an Eigen value greater than 1 and they account for 99% of total variance. The first factor accounts for 60.4% of the total variance and therefore common method bias can be confirmed. Hence, CRM can be considered as unidimensional construct. To support this, a common factor was added to the AMOS model, measuring the common variance between all constructs. The result shows regressions of 1.00 within the measurement model, which result in a common variance of 100% (as the squared regression results in 1.00).

For the BP model, the test shows that all factors have an Eigen value greater than 1, in fact 9 of 10 factors report an Eigen value greater than 2 and they account for 97% of total variance. The first factor accounts for 57.9% of the total variance and therefore common method bias can be confirmed. Hence, BP can be considered as unidimensional construct. To support this, a common factor was added to the AMOS model, measuring the common variance between all constructs. The result shows regressions of 1.34 within the measurement model, which result in a common variance of 179% (as the squared regression results in 1.79).

Performing Harman’s Single factor test for all factors applying the 5-dimensional research model (see next section), the test shows 19 of 28 factors with an Eigen value greater than 1 and they account for 92.2% of the total variance. The first factor accounts for 47.2% of the total variance and therefore common method bias does not seem to be an issue, even though 47.2% is explained by one single factor. To support this, a common factor was added to the AMOS model, measuring the common variance between all constructs. The result shows regressions of 0.00 within the measurement model, which supports that common method bias is not an
issue as the correlations are below the 0.30 threshold (Lindell & Whitney, 2001; Marbach et al., 2016; Podsakoff et al., 2003). In conclusion, common method bias has been confirmed for CRM and BP but not for the 5-dimensional research model. Hence, CRM and BP can be considered as unidimensional constructs. Appendix 14 shows the results of all tests. The next section introduces the research models.

6.7 Structural research models

Based on the findings of common method bias test, it can be assumed, that CRM and BP are unidimensional. For this reason, the first model will be a unidimensional model, testing only H0. In addition to H0 and as presented in section 4.3 four hypotheses have been developed, whereas H4 can be detailed in two sub-hypotheses. H4 measures the impact of analytical technologies and applications on business performance, which can be summarised in one construct or divided into two, identifying if there is a different correlation between the actual technology or the implemented applications. As Hair et al. (2019) suggest to compare two or more models with each other, the following paragraphs will compare the 4-dimensional model that summarises analytical technologies and applications in one construct while the 5-dimensional model separates it into two constructs. Prior to that, the unidimensional model will be presented.

Figure 6—14: Unidimensional structural model
The unidimensional research model shows a very strong relationship between CRM and BP reporting SRW = 0.56, S.E: = 0.07, C.R. = 10.19, p = 0.001. Hence, the main research question can be confirmed being statistically significant and reporting reasonable model fit indices GFI = 0.77, NFI = 0.84, CFI = 0.87 RMSEA = 0.08 and SRMR = 0.05. Moreover, standardised regression weights are between 0.64 and 0.81 for CRM construct and between 0.65 and 0.75 for BP constructs. Squared multiple correlations are between 0.41 and 0.66 for CRM and between 0.42 and 0.56. On average (CRM = 0.58 and BP = 0.52), it can be argued that most of the measured variance per items is explained by the item and less than 50% are represented by the measurement error. R-squared (R²) can be reported with 0.32, which means that 32% of the variance of BP can be explained by CRM. Lastly, the reported correlations between e28 and e27 as well as between e22 and e21 are statistically significant at the level of 0.001, while the correlation between e23 and e21 is statistically significant at the level of 0.01.

Figure 6—15: 4-dimensional structural model
The 4-dimensional research model shows a strong relationship between aCRM applications and BP (SRW = 0.38, C.R = 2.91, p = 0.03) as well as a relationship between success measurement and BP (SRW = 0.22, C.R = 1.39, p = 0.17). A relationship between CRM Strategy or CRM Implementation and BP could not be measured. Moreover, the correlations between the CRM constructs are between 0.66 and 0.92, showing that the CRM constructs are closely related to each other. Standardised regression weights are between 0.75 and 0.71 for CRM constructs and between 0.65 and 0.75 for BP construct. Squared multiple correlations are between 0.57 and 0.77 for CRM and between 0.42 and 0.56. On average, it can be argued that most of the measured variance per items is explained by the item (Average Squared multiple correlation for CRM = 0.66 and BP = 0.52), and less than 34% for CRM and less than 48% (for BP) are represented by the measurement error. R-squared (R²) can be reported with 0.33, which means that 33% of the variance of BP can be explained by CRM. In conclusion, the 4-dimensional model reports reduced variance explained by the error terms of the CRM constructs and higher standardised regression weights. Also, it explains +Δ1% of total variance. Looking at the model fit indices GFI is still acceptable with 0.87 (Baumgartner & Homburg, 1996; Doll et al., 1994) while all other model fit indices are ideal.

Figure 6—16: 5-dimensional structural model
The 5-dimensional model separates the analytical CRM construct into two (C.1 measuring CRM technology and C.2 measuring the actual usage i.e. the application). The results show, that both constructs have an impact on BP. However, the relationship of the technology (i.e. construct C.1) is much stronger (SRW = 0.20, C.R = 2.05, p = 0.04) than the relationship of the aCRM applications in C.2 (SRW = 0.12, C.R = 0.73, p = 0.47). As within the 4-dimensional model, a relationship between CRM Strategy or CRM Implementation and BP could not be measured. Also, the correlations between the CRM constructs are very similar between 0.66 and 0.91, showing that the CRM constructs are closely related to each other. Standardised regression weights are between 0.72 and 0.87 for CRM constructs and between 0.65 and 0.75 for BP construct. Squared multiple correlations are between 0.62 and 0.78 for CRM and between 0.42 and 0.56. On average, it can be argued that most of the measured variance per items is explained by the item (Average Squared multiple correlation for CRM = 0.69 and BP = 0.52), and less than 31% for CRM and less than 48% (for BP) are represented by the measurement error. R-squared ($R^2$) can be reported with 0.33, which means that 33% of the variance of BP can be explained by CRM. In conclusion, the 5-dimensional model reports reduced variance explained by the error terms of the CRM constructs and similar standardised regression weights compared to the 4-dimensional model. Also, $R^2$ did not change, which means that total variance explained remains equal at 0.33. Looking at the model fit indices GFI is acceptable with 0.90 as well as all other model fit indices are ideal.

Analysing model fit, the unidimensional model shows the worst indices while the 5-dimensional model reports the best model fit indices. The results show that the 5-dimensional model offers a better solution for measurement of the gathered data in comparison to the 4-dimensional model ($\Delta \chi^2 = - 190.34$, $\Delta df = -5$, $\Delta GFI = +0.03$, $\Delta NFI = +0.01$, $\Delta CFI = +0.01$, RMSEA $= +0.01$, SRMR $= 0$). Hence, this model is used for the further hypotheses testing. Nonetheless, and because the 4-dimensional model one only lacks slightly with its GFI-score, it will be considered within the discussion, even though the exact measurement scores will be derived from the 5-dimensional model. Moreover, the unidimensional model will be used to address the overall research question (i.e. hypothesis 0) even though it has the worst (but still reasonable) model fit indices. The model comparison can be seen in the following table 6-7 and in appendix 15. Next, the hypotheses will be tested.
Hypotheses testing

This section reports the results of the hypotheses testing. Thereby, H0 will be tested first based on the unidimensional model. Afterwards H1 – H4 will be tested using the 5-dimensional model.

H0 states, that a structured CRM implementation positively impacts business performance and can be supported within the unidimensional model showing SRW = 0.56, S.E: = 0.07, C.R. = 10.19, p = 0.001. Consequently, the study shows, that CRM has a positive impact on the business performance. To further detail this finding, H1 till H4 will provide insights into the single CRM constructs and their impact on BP. Thereby the 5-dimensional model is used as research model and as basis for discussion. Additionally, results from the 4-dimensional model will be reported as well and marked in grey.

H1 states, that CRM Strategy has a positive impact on BP and cannot be supported within the model(s) showing SRW = -0.02 / 0.03, S.E: = 0.10 / 0.10, C.R. = -0.21 / -0.32, p = 0.83 / 0.75. Consequently, the study shows that the existence of a CRM Strategy has no impact on the business performance.

H2 states, that a CRM Implementation has a positive impact on BP and cannot be supported within the model(s) showing SRW = 0.03 / 0.02, S.E: = 0.14 / 0.14, C.R. = 0.22 / 0.16, p = 0.83 / 0.87. Thus, the study shows that the planning and implementation of a CRM software has no impact on the business performance.

H3 (which has only been tested with the 4-dimensional model) states, that the usage of analytical CRM has a positive impact on BP and can be supported within the model showing SRW = 0.38, S.E: = 0.18, C.R. = 2.19, p = 0.03. Hence, the study shows that
organisations which are using analytical components within their CRM System increase their business performance. With that said, H3a and H3b are analysed closer.

**H3a** (which has only been tested with the 5-dimensional model) states, that the implementation and usage of analytical technologies within CRM systems has a positive impact on BP and can be supported within the model showing SRW = 0.20, S.E: = 0.10, C.R. = 2.05, p = 0.04.

**H3b** (which has only been tested with the 5-dimensional model) states, that the adoption of technologies, i.e. the usage of analytical business applications within CRM systems has a positive impact on BP and cannot be supported within the model showing SRW = 0.12, S.E: = 0.17, C.R. = 0.73, p = 0.47, as it is not statistically significant. In conclusion, the support of **H3** can be derived from the implementation of analytical technologies and not from the company-wide usage of applications. This phenomenon will be further discussed in the next section.

**H4** states, that the measurement of CRM success within an organisation, has a positive impact on business performance and can be supported within the model showing SRW = 0.28 / 0.22, S.E: = 0.16 / 0.16, C.R. = 1.77 / 1.39, p = 0.08 / 0.17. Even though the p-value indicates a statistical significance of ‘just’ 0.08, which is above the ideal value of 0.05 to reject the null-hypotheses, this hypothesis can be supported as an ‘indication’ of the effect from CRM success measurement on BP. The p-value of 0.08 can formally not considered as statistically significant, because there is still an 8% chance that the null-hypotheses is true while at the same time the p-value does not mean ‘nil’. Also, if the study increases the sample-size to a larger number, p-values are becoming less meaningful as they the increasing number of participants will reduce the p-value. This issue has been addressed by Lin et al. (2013) suggesting more statistical test instead of purely relying on the p-value indication. Obviously, a p-value of 0.08 is not enough evidence to state that the hypotheses can be confirmed as statistically significant. However, this does not mean that there is no effect between CRM success measurement and BP (Sterne & Smith, 2001). Hence, the p-value itself should not be used as single-indicator to reject the null-hypotheses at an arbitrary cut-off level of 0.05. Besides Lin et al. (2013) leading medical journals are
considering the p-value as less informative, if applied as stand-alone indication (Grunkemeier et al., 2009). As this hypothesis does not only rely on the p-value but also measures model fit indices within a structural equation model, this hypothesis will be confirmed as ‘indication’ of an effect and thereby must be considered as less strong effect with a statistically significance level at a 0.1 level. Consequently, organisations may increase their business performance, if they pro-actively measure the success of their CRM.

Table 6-8: Results of hypotheses testing

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Unidimensional Model</th>
<th>4-dimensional model</th>
<th>5-dimensional model</th>
</tr>
</thead>
<tbody>
<tr>
<td>H0: Systematic CRM implementation positively affects BP</td>
<td>Supported</td>
<td>0.56</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.19</td>
<td>**</td>
</tr>
<tr>
<td>H1: CRM strategy has a positive impact on BP</td>
<td>Not</td>
<td>0.01</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.12</td>
<td>0.75</td>
</tr>
<tr>
<td>H2: CRM planning and implementation has a positive impact on BP</td>
<td>Not</td>
<td>0.03</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.16</td>
<td>0.87</td>
</tr>
<tr>
<td>H3: Usage of aCRM technologies and adoption of business applications</td>
<td>Supported</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.19</td>
<td>0.03</td>
</tr>
<tr>
<td>H3a: Usage of aCRM technologies positively affect business performance</td>
<td>Supported</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.19</td>
<td>0.03</td>
</tr>
<tr>
<td>H3b: High adoption of aCRM/business applications positively affect business performance</td>
<td>Not</td>
<td>0.12</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.17</td>
<td>0.47</td>
</tr>
<tr>
<td>H4: The measurement of CRM success has a positive impact on business</td>
<td>Supported</td>
<td>0.22</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.39</td>
<td>0.17</td>
</tr>
<tr>
<td>performance</td>
<td></td>
<td>0.28</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.77</td>
<td>0.08</td>
</tr>
</tbody>
</table>

*** = statistically significant at the 0.001 level

Table 6-8 summarises the results of the hypotheses testing (see also table 8-1) and is also included within appendix 15, where the results of the model comparison are detailed. The next section uses the 5-dimensional model and analyses the hypotheses with two different organisational distinctions (i.e. organisation size and ownership).

6.9 Distinction by organisational characteristics – Model fit

The 5-dimensional model was adjusted by introducing two different sub-models based on organisational characteristics with the aim to achieve rigour (i.e. more detailed findings). First, the model was distinguished by the organisational size. Therefore, the data was split into two groups. The first group represents large(er) organisations with a total number of employees between 1.000 and 9.999. The second group represents small(er) organisations with a total number of employees between 250 and 999. The large(er) organisations account for 44.80% of the sample with n=224 and the small(er) organisations account for 55.20% of the samples with n=276. Second, the model was distinguished by the organisational ownership i.e. if an organisation is family owned or not. Again, the data was split into two groups. The first group represents organisations that are family owned and accounts for 37.60% of the sample with n=188. The second group represents organisations that are not family-owned and accounts for
60.60% of the sample with \(n=303\). The residual 1.80% (\(n=9\)) were not considered, as the respondents did not know if the organisation is family-owned or not.

Table 6-9: Overview of model fit indices for the distinguished models

<table>
<thead>
<tr>
<th>Model Fit</th>
<th>Small Organisations ((n=276))</th>
<th>Large Organisations ((n=224))</th>
<th>Family-owned Organisations ((n=188))</th>
<th>Non-Family-owned Organisations ((n=303))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square ((\chi^2))</td>
<td>658.28</td>
<td>783.41</td>
<td>637.91</td>
<td>707.37</td>
</tr>
<tr>
<td>Degrees of freedom</td>
<td>332</td>
<td>332</td>
<td>332</td>
<td>332</td>
</tr>
<tr>
<td>Probability level</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>The Goodness of Fit Index (GFI)</td>
<td>0.85</td>
<td>0.80</td>
<td>0.81</td>
<td>0.85</td>
</tr>
<tr>
<td>NFI</td>
<td>0.90</td>
<td>0.85</td>
<td>0.86</td>
<td>0.89</td>
</tr>
<tr>
<td>CFI</td>
<td>0.95</td>
<td>0.90</td>
<td>0.93</td>
<td>0.94</td>
</tr>
<tr>
<td>RMSEA</td>
<td>0.06</td>
<td>0.07</td>
<td>0.07</td>
<td>0.06</td>
</tr>
<tr>
<td>SRMR</td>
<td>0.04</td>
<td>0.05</td>
<td>0.05</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Table 6-9 shows that all four models are acceptable for further hypotheses testing. Even though all models show a lower GFI, GFI scores are between 0.80 and 0.85 which is still acceptable and applied in other research studies (Doll et al., 1994; Marbach et al., 2016). Likewise, the NFI score is slightly below 0.90 for the group of large, family-owned and non-family-owned organisations but still at an acceptable level more than 0.85 (Baumgartner & Homburg, 1996).

All other model fit indices are equally ideal, as for the 5-dimensional model without any distinction. Based on these models, four additional analyses have been performed equally as for the initial hypotheses testing with the 5-dimensional model (see section 7.3 and 7.4). The next section reports the results of these analyses for the five main hypotheses.

6.10 Distinction by organisational characteristics – Hypotheses

**H1** was not supported with the 5-dimensional model nor within the 4-dimensional model (see section 7.4). Investigating H1 according to the organisational differences, no new insights could be generated, as none of the four groups supports the hypotheses. However, the most approximate results can be found within the group of large organisations reporting \(\text{SRW} = -0.33\), \(\text{S.E.} = 0.33\), \(\text{C.R.} = -1.10\), \(p = 0.27\). Even though no statistical evidence can be reported from the data, it might be speculated, that CRM Strategy has a negative impact on the business performance of large organisations.

**H2** was also not supported with the 5-dimensional model nor within the 4-dimensional model (see section 7.4). However, the analysis within the group of family owned organisations provides statistical evidence, that the hypotheses cannot be supported but contradicted. In other words, the data shows that solid CRM implementation (and its planning) has a negative
impact on business performance for family-owned businesses reporting SRW = -0.41, S.E: = 0.23, C.R. = -1.78, p = 0.08. This statement clearly disagrees from the given literature so far and will be further discussed in section 7.7.

**H3a** was supported based on the 5-dimensional model in section 7.4. In addition, the distinguished models show, that small organisations as well as family-owned organisations have the highest impact on this confirmed hypothesis. Hence the availability of analytical technologies has the strongest impact on BP for family-owned organisations reporting SRW = 0.48, S.E: = 0.14, C.R. = 3.66, p < 0.001 and a clear impact on small organisations reporting SRW = 0.25, S.E: = 0.14, C.R. = 1.96, p = 0.05. With that said, no support could be found for large organisations nor for non-family-owned organisations.

**H3b** was not supported with the 5-dimensional model nor within the 4-dimensional model (see section 7.4). Investigating **H3** according to the organisational differences, no new insights could be generated, as none of the four groups supports the hypotheses. However, the most approximate results can be found within the group of large organisations reporting SRW = -0.79, S.E: = 0.66, C.R. = 1.35, p = 0.18. Even though no statistical evidence can be reported from the data, it might be speculated, that the usage of analytical CRM applications has a negative impact on the business performance of large organisations.

**H4** was supported based on the 5-dimensional model in section 7.4. In addition, the distinguished models show that small organisations as well as family-owned organisations have the highest impact on this confirmed hypothesis. Hence the measurement of CRM success has the strongest impact on BP for family-owned organisations reporting SRW = 0.59, S.E: = 0.36, C.R. = 2.06, p = 0.04 and an equally strong impact on small organisations reporting SRW = 0.39, S.E: = 0.17, C.R. = 2.30, p = 0.02. With that said, no support could be found for large organisations nor for non-family-owned organisations, even though a statistically non-significant support can be assumed for non-family-owned organisations as well reporting SRW = 0.30, S.E: = 0.24, C.R. = 1.16, p = 0.25
Table 6-10 summarises the estimates from the analyses for all hypotheses according to the corresponding group (i.e. organisational differentiations). Concluding this analysis, it can be reported, that H2 could be partly supported for family-owned organisations and H3a as well as H4 could be confirmed more precisely for small and family owned organisations. The next section discusses these findings in conjunction with the findings from section 7.4.

6.11 Summary

After having introduced all necessary measures to assess validity, reliability and good model fit, two models have been established and tested measuring CRM and BP. Both measurement models can be accepted as useful measurement models with solid reliability scores, very good validity scores and excellent model fit scores performing CFA. The CRM model shows good model fit indices and can be accepted as useful model to measure CRM as a construct. Even though one SIC score is not smaller but only equal to the corresponding AVE, the model’s reliability and validity can be confirmed as well. The BP model shows excellent model fit indices and can be accepted as useful model to measure BP as a construct. Within this model, the reliability can be accepted but is not perfect, as two of three CR scores are only on a minimal acceptable score of 0.65 (instead of above 0.7). However, and due to good Cronbach alpha scores, reliability can still be accepted as well as the validity of the BP model.

Afterwards common method bias was analysed showing, that CRM and BP may be considered as unidimensional constructs, as one factor explains more than 50% of the model. Within a combined analysis (using the structural model) of CRM and BP, CMB could not be confirmed.

Based on this, three structural research models have been presented covering a unidimensional, 4-dimensional and 5-dimensional model. Best model fit indices could be reported for the 5-dimensional model. Consequently, this model was used for the hypotheses
testing and the other models served as supportive models. Lastly, a distinction by organisational characteristic (size and ownership of organisations) was performed for further analysis. The next chapter represents the actual findings within the research model and discusses their results.
7. Chapter – Discussion

7.1 Introduction

This chapter discusses the results from chapter 5. Hereby, the structure follows the data analysis, i.e. first the measurement models and its constructs are discussed including the relationships. Hence, section 7.2 and 7.3 are dealing with CRM while section 7.4 and 7.5 are covering aspects around BP. Subsequently, section 7.5 debates all hypotheses between the constructs. For all discussions, the 5-dimensional structural model is used as primary research model. However, the measurement models of CRM and BP are being considered, as well as the uni-dimensional and 4-dimensional structural model discussing non-existing relationships.

Table 7-1: Classification of relationships

<table>
<thead>
<tr>
<th>Estimation range</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>+/-1.00 and +/-0.80</td>
<td><strong>Very strong</strong> (positive or negative) relationship</td>
</tr>
<tr>
<td>+/-0.79 and +/-0.60</td>
<td><strong>Strong</strong> (positive or negative) relationship</td>
</tr>
<tr>
<td>+/-0.59 and +/-0.40</td>
<td><strong>Moderate</strong> (positive or negative) relationship</td>
</tr>
<tr>
<td>+/-0.39 and +/-0.20</td>
<td><strong>Weak</strong> (positive or negative) relationship</td>
</tr>
<tr>
<td>+/-0.19 and +/-0.00</td>
<td><strong>No</strong> (positive or negative) relationship</td>
</tr>
</tbody>
</table>

When discussing regression weights, correlations and factor loadings the following table shows which ranges and interpretation are applied. The next section 7.2 starts with the discussion of CRM and its constructs.

7.2 The CRM constructs and their relationships

The target of this study was to identify how organisations are using CRM and to identify how this impacts business performance. To do so, several dimensions of CRM have been discussed within the literature review. As a result, five dimensions were researched and will be discussed in this section in three steps. First, the excluded items (due to validity and reliability) will be analysed. Second, the construct and all remaining items will be discussed. Third, the

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8 This classification applies for correlations, std. estimation weights and factor loadings within the structural and measurement model.
relationship to other constructs are validated. Finally, the key statements of the discussion are summarised at the end of each section.

### 7.2.1 CRM Strategy

Within the survey, five questions have been asked to determine the strategic standpoint of the organisations. Due to poor reliability and validity results, the items covering business strategy and customer feedback must be excluded. Assuming, that a CRM strategy exists, it can be argued that B2B organisations are not incorporating it into the business strategy and that customer feedback is not reflected in the CRM strategy. As 64% of the respondents have leadership responsibilities, missing awareness cannot be considered as possible explanation. Instead, missing strategical focus for CRM can be attested. One reason for this might be, that organisations are still not customer centric but rather product-driven. In addition, many of the German B2B organisations are acting in niche-markets where they do not see an urgent need to incorporate customer feedback in their strategies.

Looking at the included items, it can be concluded that customer groups, sales channels and up-to-date technologies are taken into consideration when establishing a CRM strategy. Therefore, organisations seem to view their CRM strategy as an isolated ‘instrument’ but not as a company-wide initiative. Especially, the incorporation of customer groups (0.83) and sales channels (0.84) have a very strong and positive relationship on the CRM strategy, while the consideration of newest technology (0.79) has a strong and positive relationship. Thus, it can be assumed that the CRM strategy is primarily developed from sales, marketing and service departments. One reason therefore might be the fact, that CRM strategies are often used to implement software and thereby external customer processes seem to be more in focus than the internal IT-infrastructure. Moreover, the channel-management perspective plays a major role as CRM-software aims to incorporate all customer channels. Due to the increasing possibilities to contact organisations (e.g. social media or instant messaging) channel management becomes increasingly important for German B2B organisations. Observing the strong relationship of customer groups on CRM strategy, the unification of marketing and sales plays a major role. In former times, B2B organisations were strongly sales driven and marketing was seen as sales-support managing advertisement. Nowadays, customer groups
are mostly identified and managed by marketing and marketing thereby impacts CRM strategy.

CRM Strategy has a strong positive relationship to all other constructs. Not surprisingly, the strongest relationship (0.83) exists to **CRM planning and implementation**. From a practitioner’s perspective, this seems logically as every strategic orientation helps to operationalise, i.e. to implement CRM software. For instances, it is much easier to implement a CRM software if you are aware of the strategic relevance for each customer group or sales channel. However, CRM planning and implementation is owned by the IT department most of the times while the strategy development is owned by the sales, marketing and service departments. To avoid a conflict between strategy and implementation, it makes sense to incorporate IT into the CRM strategy development and let the business departments lead their CRM implementations.

The data also confirms, that CRM Strategy has a positive and strong relationship to **aCRM technologies** (0.69) and to **aCRM applications** (0.72). Firstly, analytical CRM technology can only be used if technology receives the necessary attention, also on a strategic level. Assuming an organisation is data driven and focuses on the analysis of their data, it must incorporate this into the CRM strategy to make relevant technologies (e.g. predictive analytics) available. If an organisation is not data-driven, it still needs some basic information about their operations, such as forecasting figures or clustered data to establish customer groups within the CRM strategy. In both cases analytical CRM technology supports the creation and development of CRM strategy to some extent. Secondly and consistently with the aCRM technologies, the usage of these technologies also relates strongly to CRM strategy. A possible explanation for this might be, that the gathered insights from using these analytical technologies help to develop the strategy further. For instance, if reasons for complaints are a regular management report within a CRM software it can be assumed, that CRM strategy includes activities to properly respond to and to reduce these complaints. Unfortunately, the CRM construct did not include customer feedback as item because of missing reliability and validity. From a data perspective, this leads to an implicit inconsistency. On the other side, the participants might not know customer feedback is included in the strategy, because they do it
unconsciously by influencing their top-management with their operational insights (e.g. reasons for customer complaints).

Compared to the other constructs, the relationship to **CRM success measurement** is the weakest, but can still be considered as strong and positive (0.66). A positive relationship between the two have been assumed a-priori, because every strategy should include measures that allow organisations to evaluate and refine their strategy. However, these results should be interpreted with caution, because only employees from controlling have a complete overview of such a success measurement and only 7% of the respondents were from finance and controlling. Nevertheless, these rather disappointing results might also be a given fact, as many organisations are struggling in the operationalisation of CRM strategies and even if they do, they might only measure some specific dimensions of CRM. For instances an organisation might measure the success of a CRM strategy, if customer satisfaction increases but they do not link it back to financial indicators such as turnover or gross margin.

In conclusion the following key statements can be summarised when discussing CRM strategy:

- CRM Strategy does not include customer feedback and is not embedded into business strategy and therefore seen as ‘isolated’ instrument for marketing, sales and service;
- Business departments, especially marketing, impact CRM strategy more than IT departments;
- CRM strategy requires data-insights and therefore analytical technologies, no matter if the organisation is data-driven or not;
- aCRM technology supports the creation and development of CRM strategy;
- The strong relationship between aCRM applications and aCRM strategy implies that organisations implicitly incorporate customer feedback (e.g. reasons for complaints) to their strategy;
- CRM strategy needs a comprehensive success measurement, which is multi-dimensional (internal, external and financial) and available for all affected employees within an organisation.
7.2.2 CRM Planning and Implementation

Within the planning and implementation construct, none of the measurement items had to be excluded due to bad reliability or validity. Hence, the construct is measured by the following five items: Process to define requirements (0.82), Training (0.84) and Change Management programme (0.83), Communication process (0.83) as well as dedicated project management (0.82). These results support the idea, that a profound CRM implementation is multidimensional and includes aspects of change management and communication processes as much as the basics of project management. In line with previous studies and the literature review in this study (which made a distinction between technological and organisational success factors) the results strongly support the importance of these organisational success factors. However, no data was generated with regards to the technological perspective of CRM planning and implementation. For instances, if good IT-architecture (e.g. bandwidth) has an impact on the success of a CRM implementation.

Looking at the individual success factors derived from this study, all of them have a very strong and positive relationship to the success of CRM implementation. First, a clear process to define requirements very strongly relates to the success of a CRM implementation. A possible reasoning for that might be simple: If an organisation clearly defines and remains with their requirement definition, it is easy to fulfil these requirements and thereby plan and implement CRM successfully. Secondly, the results show that training and change management programmes are crucially important. While training seems to be a logical task to do, many organisations are neglecting the importance of change management and don’t allocate enough budget for it. The difference between training and change management could also be identified within the data, as the training relationship and squared multiple correlation is slightly stronger (Δ 0.01). As the difference is very small, it is difficult to explain this result, but it might be related to the fact, that 76.6 % of the organisations have less than 500 CRM users and change management is included within the training programme which might be enough for smaller CRM organisations. Thirdly, clear communication processes indicate a very strong relationship (0.83) as well. Having a clear communication process in place updates, involves and engages people within the change process and it therefore seems consistent, that the data shows an equally strong relationship compared to the change management
relationship. Fourthly and lastly, the study confirms that a dedicated *project management* (0.82) positively affects the planning and implementation success of CRM. In comparison to the other factors project management contributes the least. Even though, the differences are minimal (between \( \Delta 0.01 \) and \( -0.02 \)) it can be assumed that the internal project management has not the biggest impact on the success of CRM implementation. A possible explanation therefore might be, that CRM projects mostly run out of budget and/or time anyway and the evaluation of success is not primarily focusing on project management indicators but more on the assessment of the CRM software, whether it contributes to further business success and if it supports business operations.

The construct of planning and implementation correlates strongly to three other constructs. First, it strongly correlates to *CRM strategy* (0.83). As discussed earlier, strategy supports the actual implementation but also vice versa. If an organisation can plan properly and report successful implementation(s) they receive further trust, time and budget to extend their implementations and thereby influence the CRM strategy. Second, the correlation to *aCRM technologies* (0.79) and *aCRM applications* (0.83) show that organisations that plan and implement successfully can provide analytical technologies and use them. The difference between the availability and usage of these technologies (\( +\Delta 0.03 \)) can be explained by the fact that not all respondents are aware of the underlying technology (e.g. clustering), because they are focused on the actual application (e.g. sales analysis). These relationships may be partly explained by user acceptance. If a CRM implementation is properly planned and implemented (e.g. features are announced and released as promised) users are aware of the (analytical) applications and use them. Otherwise, organisations might release new features, but no-one is aware of them and user acceptances declines. Besides reliability and trust, change management and communication is vital to develop and implement the needed analytical features. Therefore, it is important to plan and implement a sound requirement definition, a clear communication and a thoughtful success measurement. Not surprisingly, *success measurement* relates very strongly (0.82) to CRM planning and implementation as well. These findings are consistent with many other studies, which have been incorporated within the literature review. Successful implementation can only be made, if a success measurement follows at the end of the implementation. Otherwise the evaluation of success or failure
remains a subjective estimate. Moreover, it is much easier for organisations to plan an implementation if they (1) define the targets from the very beginning and (2) if they can take recourses to existing projects which have been considered as success or failure.

In conclusion the following key statements can be summarised when discussing CRM planning and implementation:

- CRM planning and implementation is multi-dimensional and requires strong attention to organisational success factors such as a dedicated project management;
- Clear requirement definitions help to plan, implement and measure the success of the CRM implementation;
- (Smaller) Organisations do not clearly differentiate between training, change and communication programmes and seem to implement them all at once;
- Project management impacts the success of CRM planning and implementation, but is not the key factor;
- Good planning and implementation drive the usage of analytical technologies;
- Success measurement can be considered as back-bone for successful planning and implementation of CRM.

### 7.2.3 aCRM Technologies and applications

The following two concepts are summarised in this section, as they are closely related to each other. Within the reliability and validity analysis clustering and classification had to be excluded within the aCRM technology construct while applications for sales analysis and marketing campaigns had to be excluded within the aCRM application construct. A possible explanation for the exclusion of clustering and classification might be that the participants were not able to distinguish between the two analytical technologies. Another reason might be that these analysis technologies are not known to the employees even though they might use them within a CRM software unconsciously. It is somewhat surprising that the gathered data for the most basic analysis (i.e. sales analysis and marketing campaigns) cannot be included as measurement item. Contrary to the expectations, one explanation therefore might be, that the answers were to wide-spread i.e. organisations are using sales and campaign analysis either a lot or not at all within the CRM system.
Observing the remaining factors for aCRM technology, the results show a very strong and positive relationship between forecasting (0.86), data visualisation (0.88) and predictive analytics (0.81) and the availability of aCRM technologies. These relationships can be explained by the fact, that the participants have heard of these technologies, so that they relate them to the usage of analytical technologies. As data visualisation and forecasting have the strongest impact, it can be assumed that participating organisations are using these technologies, no matter with which kind software (e.g. excel, BI-software). However, the results also suggest that organisations which are using aCRM technologies apply predictive analytics as well, which can be considered as unrealistic from the researcher’s practical experience. Overall, it is difficult to explain this result, and it might be again related to the unequal or missing understanding of predictive analytics.

Looking at the aCRM application factors, the data indicates a positive and strong correlation between the analysis of Customer activities (0.79) and the usage of aCRM. Moreover, a very strong correlation between the analysis of customer loyalty (0.84), cross- and up-selling (0.80), reasons for customer complaints (0.83) and the usage of aCRM could be identified. The result for the analysis of customer activities confirms the a-priori assumption that customer activities are one of the key areas to be analysed. Also, the residual results confirm that the concentration of after-sales activities (also within analytical applications) are key for organisations to maintain and improve their customer retention. Customer loyalty and customer complaints have been identified as being the most important area for CRM analysis. Several factors could explain this observation. First, customer loyalty can include several analytical applications (e.g. customer satisfaction survey, repetitive-buyer analysis, etc.). Second, Customer complaints are the most obvious thing to analyse as they provide direct feedback to your organisation. Third, customer loyalty and customer complaints are often used as basis for customer classifications or targeted activities (e.g. phone campaigns). This study also confirms the existence of cross- and up-sell analysis. This result is likely to be related to the fact, that every sales man must identify cross- and upselling opportunities to achieve their annual growth targets. Hence, the results are related to other studies who confirm that new customer acquisition is more expensive than selling to existing customers. Consequently, organisations are analysing these selling opportunities. Lastly, customer activities (e.g. visits or phone calls)
were found to be important for analytical applications as well. This result can be explained by the increasing competition of online-sales and the decreasing availability of sales specialists. Nowadays, organisations must focus their (expensive) sales professionals on key accounts or big sales opportunities, as the commodity sales are mainly achieved via digital sales channels. Hence, an analytical application to control sales activities is a good measure to evaluate the existence of a CRM usage.

Both constructs correlate strongly with each other (0.82), which confirms that the availability of technology supports the application of CRM analytics and vice versa. In other words, if organisations start providing analytical technologies, they will also be able to use specific analytical applications and the development of these applications require new technologies. Both constructs also correlate strongly to **CRM strategy** (0.69 / 0.72). As discussed in section 7.2.1 analytical technologies and applications are necessary to refine the strategy and the CRM strategy can include the development of analytical technologies and applications. The difference between the correlations are explained by the fact that the applications (e.g. data visualisation) are more visible to management who works on the strategy. Hence, aCRM applications correlate stronger with CRM Strategy than the underlying technologies (+Δ0.03). The results show an equal difference for the residual correlations, whereby the aCRM applications always correlate stronger to the other construct.

However, the most unexpected finding is, that the aCRM applications have a stronger impact on the **CRM implementation** than the actual technology (+Δ0.04). Even though the difference is small, this finding could be due to a good requirement definition. In other words, if organisations follow a clear implementation plan, they have higher chances to implement analytical applications as well. The other way around, it can be argued that a CRM system will be further developed (i.e. new functionalities will be implemented), if they make use of the analytical capabilities and interpret the data for new functionalities. Due to the slight differences between these two constructs these results must be interpreted with caution.

Considering the correlations to **CRM success measurement**, the differences are more significant (+Δ0.1). Although, the data shows that both correlations are very strong and positive, aCRM applications has a much stronger impact on the CRM success measurement. Taken the single measures into consideration a simple explanation can be found, as data
visualisation is key to evaluate the success of CRM. Hence, if organisations can provide data visualisation within their CRM, they can perform success measurement better. The same explanation can be applied to forecasting and even predictive analytics. The result can also be explained from the success measurement perspective. Organisations that perform a success measurement to evaluate their CRM performance need analytical applications (e.g. forecasting or data visualisation) to derive and communicate the results.

In conclusion the following key statements can be summarised when discussing aCRM technologies and applications:

- Organisations are not aware of the difference between classification and clustering;
- Indicators for a strong usage of analytical technologies are forecasting and data visualisation;
- Organisations are focusing their analytical efforts on customer loyalty, reasons for customer complaints and cross- and up-selling applications;
- aCRM applications have a slightly stronger impact on the CRM strategy than its underlying technologies;
- aCRM applications support further developments of CRM and promote the results of CRM success measurements.

### 7.2.4 CRM Success Measurement

Lastly, the construct of CRM success measurement is discussed in this last section. During the development of the research model two out of five factors have been excluded, to achieve good model fit. These two factors investigated the implementation (i.e. non-operating) costs and the system operating costs. These two factors showed the highest measurement errors (0.37 / 0.24) within that construct, which indicates, that the participants interpreted the construct in two different ways. One group might have interpreted it in a rather non-technical way, assuming that the success of CRM is measured by output related KPIs such as financial improvements. Another group might have interpreted it from a technical and project-oriented way looking only at system implementation and operating costs. Moreover, these two items did not show high correlations to the construct of aCRM applications and technologies. Hence it can be argued, that the aCRM technology has no correlation to the existences of a CRM
success measurement. In conclusion the measurement error was high, and the items have been excluded from the research model. In addition, the results indicate that CRM success measurement can be evaluated by focusing on improvements only and does not include any costs-aspects. This is an interesting finding, as the literature suggests that ROI-calculations are a reasonable method to determine the short-term success of CRM projects. Again, this contrary finding might be explained by the interpretation of CRM success, as most of the participants belong to management and do not focus on the operational project management aspects.

Looking at the remaining three items, which have been included in the research model, it can be summarised that the findings are mostly in line with existing and well-established literature around success measurement. Internal (0.87), external (0.88) and financial improvements (0.84) have a strong and positive impact on the success measurement of CRM. These results confirm the association between internal processes and external customer awareness. Thus, it can be argued that CRM success requires the alignment between internal processes and external customer requirements. In other words, if an organisation can meet the customer requirements, their internal processes will improve as well, and CRM can be considered as successful. These findings must be interpreted with caution, because internal and external improvements are influenced by other mediating factors. For instance, if there is a product issue, customer may be satisfied with the CRM processes (e.g. how to handle the customer complaint) but the disappointment of the defective product is stronger so that the customer satisfaction declines. With the internal and external improvements being the two stronger factors (+Δ0.03 / +Δ0.02), it can be argued that the measurement of CRM success is mainly explained by external improvements such as customer satisfaction as well as by internal improvements such as shorter process lead-times. These findings suggest, that CRM success is less dependent on financial improvements. However, with such a small difference between the improvement measures, this dependency might change with other samples. In addition, the financial improvements cannot be measured directly, as they are influenced by many other mediating factors (i.e. organisational activities, market circumstances, etc.).

As all correlations between CRM success measurement and the other constructs have been discussed in the previous sections, the following key statements within the construct can be summarised when discussing CRM success measurement:
• Organisations which are performing CRM success measurement focus on the measurement of internal, external and financial improvements and not on operating-costs;
• External and internal improvements are the strongest indicators for the success of CRM;
• Financial improvements are a good indicator to measure CRM success, but they are affected by many other mediating factors.

In conclusion, the construct of CRM measurement is focusing purely on internal, external and financial improvements which are in line with the implicit dimensions of business performance. The next section discusses the one-dimensional construct of business performance and its factors.

7.3 The BP constructs and their relationships

The last sections covered the individual CRM constructs. This section combines the constructs for BP, as they have been condensed to one construct within the structural model. However, the discussion also covers the measurement model where BP included three constructs. Thereby, the factors will be analysed first, before the construct and their correlations will be discussed. Finally, effects of the methodology will be considered, and the key statements of the discussion are summarised at the end of the section.

7.3.1 Process efficiency

Within the process efficiency construct, three out of five items had to be excluded to establish a good measurement model. Thereby, the study revealed that effectiveness of communication, perceived employee satisfaction and complexity of processes are not suitable measures to estimate the process efficiency of an organisation. The first remarkable finding indicates, that effective communication is not a measure for process efficiency. It was assumed, that effective communication supports process efficiency, as processes are communicated effectively, and employees support each other and know whom to ask in case of uncertainties. According to these data, it can be inferred that there is no such relationship between communication and processes efficiency. This implies, that organisations can achieve high process efficiency even though there is a bad communication. It is difficult to explain this finding but may be explained
by the disjointed perception of the participants. Communication is seen as informative process of information flow while process efficiency might be seen as lead time for specific activities. Secondly, the data suggests that perceived employee satisfaction is not an appropriate measure for process efficiency. Again, this result is surprising as it was assumed that ‘happy’ employees are more reliable and faster within their daily work. In contrast, it can be argued that employee satisfaction has no relation to the process efficiency because employees are not taking speed and quality into consideration when considering satisfaction. They are rather satisfied, if they are happy with their work environment, payment and colleagues. Thirdly, the study reveals that the complexity of processes should not be used as measure for process efficiency. This encouraging result implies, that also complexes processes can be very efficiency while simple processes can also be inefficient. It is possible, that these results are only valid within the context of CRM processes, because in other business areas it is a distinctive competitive advantage, if organisations are able to simplify your processes to become faster (e.g. in production). On the other side, complex processes within the CRM context can be supported a lot by technologies (e.g. analytical technologies) which allows organisations to perform them in an effective manner.

Next, the factors which measure process efficiency will be discussed. The data suggests, that a strong indicator for process efficiency is collaboration (0.75). This result meets the a-priori assumption, especially within the CRM context, that processes are more effective if the affected employees are collaborating well with each other. Thereby collaboration must be differentiated from communication. While communication was identified as non-appropriate measure, collaboration was found to be important. The reasoning behind seems simple. Collaboration aims to finish an activity within the process. Communication on the other side supports this process but also includes general communication about irrelevant information. However, a note of caution is due here since the squared multiple correlation is only moderate (0.54) resulting in a higher measurement error. The squared multiple correlation of all BP factors is moderate being between 0.42 and 0.56. Hence this measurement uncertainty must be considered also for the upcoming factors and can be explained by the measurement instrument. As the participants were asked to compare themselves with their closest competitors, a specific uncertainty remains in their estimation, due to lack of knowledge about
the competitor’s performance. Continuing with the second strongest measure lead time of
*customer processes* *(0.70)* it can be summarised that the lead time of customer processes
contributes strongly to the overall process efficiency. This makes sense, as internal processes
must be efficient to achieve a short lead time within the customer processes. Another
reasonable explanation might be, that organisations which are heavily customer focused align
their internal processes according to their customer processes. Thirdly, *available customer
information* strongly contributes *(0.65)* to internal process efficiency. Even though this
measure has the highest measurement error *(0.58)*, the finding makes sense. Knowledge
management (in this case customer information) contributes to process efficiency, as
employees spent less time searching for or gathering information while the customer is
waiting.

Finally, the correlations to customer satisfaction and financial performance will be discussed
shortly, based on the final measurement model (see section 6.5.3) but not based on the
structural research model, as this model contains only one BP construct. Process efficiency
correlates very strong with *customer satisfaction* *(0.88)*. This result is consistent with the data
observed in the individual factors and can be explained by various reasons. One reasons might
be, that organisations which are customer oriented, must align their internal processes to the
customer requirements and if they do so, internal performance as well as customer satisfaction
increases. Another explanation could be, that well-coordinated internal processes result in
higher customer satisfaction as a customer does not have to provide information twice and
will be managed professionally. On the other side, process efficiency also correlates very
strong with financial performance *(0.83)*. Again, this seems logical as the synergies from
customer satisfaction and process efficiency result in financial performance. This finding can
easily be explained by the fact, that process efficiency reduces effort and costs while high
customer satisfaction increases the income of organisations (e.g. through repetitive-buyers).
Consequently, both contribute to the financial performance within an organisation.

In conclusion, the following key statements can be summarised when discussing process
efficiency as indicator for BP:
• Effectiveness of communication, perceived employee satisfaction and complexity of processes are not suitable measures to estimate the process efficiency of an organisation;
• Collaboration plays a major role to achieve internal process efficiency
• Customer orientation and a good knowledge management support internal process efficiency as well;
• Process efficiency leads to higher customer satisfaction (and vice versa), which results in better financial performance; i.e. Customer satisfaction and process efficiency pays off.

7.3.2 Customer satisfaction
Within the customer satisfaction construct, three out of five items had to be excluded to establish a good measurement model. Thereby, the study found that % of customer survey responses, response time to customers and % of complaints are not appropriate indicators for customer satisfaction. The first interesting result is, that the share of customer survey responses is not a good indicator for customer satisfaction. This is a useful finding, as some organisations are assuming that customer satisfaction increases if you ask for their opinion. As suggested in the data, this is only one side of the medal. Asking for feedback is good, but it does not influence nor increase the customer satisfaction per se. The key point is to derive visible activities based on the customer feedback. Perhaps the most interesting finding is, that the response time to customer is not considered to be a good measure for customer satisfaction. If customers demand fast responses, this finding was unexpected. However, there are suitable reasons to explain it. First, only a minor part of customer inquiries is really urgent. Hence, customers are willing to wait a bit longer if organisations are resolving their issue professionally, without many queries and to the fullest satisfaction of the client. Second, the B2B market is a valid reasoning for this finding. Within B2B markets, customers are in a professional relationship and they are willing and able to accept issues, because they can explain them within their organisation. Moreover, B2B relationships are rather sustainable and long, because the organisations are interconnected to each other. Hence, time is not (always) crucial for them. Another very unexcepted finding is, that the share of customer complaints is not a good measure for customer satisfaction. It was expected, that the more customer
complaints are received by an organisation the lower the customer satisfaction must be. However, this study does not support this correlation, as the measure seems to be inappropriate. The finding was unexpected and suggests, that the way of handling customer complaints is more important the actual share of complaints. So, even if 20% of customers raise a complaint it is not a given fact, that the customer satisfaction is low. This can be explained with a simple example regarding flight experiences:

*If you book a flight with low-cost and you receive a coffee, you had an (unexpected) good experience, independently from the temperature and quality of the coffee. On the other hand, if you book a flight with a premium airline and the coffee is not perfectly temperature, you have a bad experience and may issue a complaint.*

In this example, the customer satisfaction of the premium airline is higher anyways, even though they receive more complaints about the coffee. This can be explained by the overall experience. The experience with regards to the coffee temperature was bad (and it was surprisingly good for the low-cost airline). However, the overall experience was better as the flight was on time, the seats were more comfortable, etc. Finally, the bad experience regarding seat comfort or delays were somehow expected when booking the low-cost airline, so that customers may not issue a complaint.

Next, the factors which measure customer satisfaction will be discussed. The research model suggests, that the share of *customer referrals* (0.75) and the share of *positive customer ratings* (0.74) strongly contribute to the overall customer satisfaction. These findings are in line with the a-priori assumptions from the literature review. Hereby, it was supposed that customers offer a referral only if they are satisfied and that the share of positive customer ratings influences the overall customer satisfaction score. Logically, an unsatisfied customer would not offer a referral nor leave a positive rating on the website or online-shop of an organisation. It is important to highlight the positive characteristic of a customer referral. Otherwise it could be argued that customer references (not referrals!) are being used independently from the satisfaction of a customer (e.g. in IT projects). The data also suggests, that the share of *loyal customers* (0.72) strongly contributes to the customer satisfaction. Again, this finding is not unexpected as loyal customers are satisfied with an organisation’s products and services. Otherwise they would no longer purchase from them. However, this interpretation can only
be made if B2B customers have an alternative organisation to buy from. If they are dependent on the organisation (e.g. using national post or train services which have a monopoly) nearly all customers will be loyal, because they have no other option to choose but the customer satisfaction is not positively affected.

Lastly, the correlation between customer satisfaction and financial performance (0.90) will be discussed while the correlation to internal process efficiency has been discussed in the previous section. It is not surprising, and in line with many other studies, that customer satisfaction pays off. In other words, if an organisation is able to achieve a high customer satisfaction over a long period of time, their financial performance (e.g. revenue, market share and net profit margin) will increase. The most well-known example for this finding is ‘Amazon’. While they have been making losses for years to achieve a high customer satisfaction, they are nowadays one of the most valuable organisations in the world, because of their financial performance. Looking at it from the other direction, it can also be argued that financially healthy organisations can invest more in customer satisfaction. For instances, if an organisation is offering special services, customer will be loyal and re-purchase again. Hence, the organisation will financially benefit in the long-run even though they had to ‘invest’ some gross-margin in the short-run. In conclusion the following key statements can be summarised when discussing customer satisfaction as indicator for BP:

- The amount of customer complaints and survey responses does not influence customer satisfaction, but how organisations manage them;
- Customer response time is not an appropriate measurement for customer satisfaction within the B2B industry;
- Customer referrals and positive customer ratings are good indicators and contribute to the overall customer satisfaction;
- Loyal customers strongly contribute to the overall customer satisfaction of an organisation (except for monopolists);
- In the long-run, organisations will financially benefit if they invest in customer satisfaction.
7.3.3 Financial performance

Within the financial performance construct, one out of five items had to be excluded to establish a good measurement model. Hence, the study found that total costs of ownership for CRM is not an appropriate measure for business performance. Hereby, Ellrams (1993) concept of total costs of ownership (TCO) was used and defined as all costs related to the CRM processes in marketing, sales and service. As this is hard to estimate for the own organisation, a reasonable explanation might be that the participants struggled to compare TCO with their nearest competitors. Moreover, TCO can be seen as theoretical indicator for financial performance within CRM but it is not suitable as indicator for the overall financial performance. Lastly, TCO covers the internal perspective of CRM costs and does not reflect any external factors. With that said, the study revealed that TCO should not be used as factor to measure financial performance.

However, the study confirmed that four other factors are good measures for financial performance. The most unexpected finding is, that the lead-to-order conversion (0.75) contributes the most within that construct. This result is surprisingly, because conversion rates are seldomly used to assess financial performance. Nevertheless, this conversion rate comprises the whole sales cycle of an organisation and therefore gives a clear estimation about the performance of the sales department. With that said, it seems compelling that an indicator of sales performance is a good measure to estimate the overall financial performance. Besides the lead-to-order conversion, the net-profit margin (0.75) contributes equally strong to the financial performance. This finding is not surprisingly as the net-profit margin serves as key performance indicator of any organisations and is widely known and used within business performance assessments. Hence, this finding supports existing studies about business performance measurement. Another result of the study shows, that market share (0.74) also contributes a lot to the financial performance. Again, this result was not unexpeected for two major reasons. First, organisations with high market share can define the market-standard-price and therefore they are able to generate more net-profit margin. Second, organisations with high market share are mostly big and ‘healthy’ enough to invest further and to overcome difficult market circumstances. For instances, a leading B2B manufacturer is diversified enough to compensate his decreasing sales in one business unit with another business unit. At
the same time, this leading B2B manufacturer can invest into new market opportunities due to his solid net-profit margin. Lastly, it was identified that sales revenue (0.72) contributes to the financial performance as well. As with the net-profit margin, this finding was not surprisingly and is consistent with existing literature about business performance measurement. Sales revenue represents the actual response from the market and therefore it is a major financial performance indicator for any organisations.

As all correlations have been discussed in the previous sections, the following key statements within the construct can be summarised when discussing financial performance:

- Total cost of CRM ownership is not a suitable measure to estimate the financial performance efficiency of an organisation;
- Well performing sales and marketing departments (i.e. with good lead-to-order conversions) contribute to the financial performance of the organisation;
- High market shares enable organisations to be flexible and therefore contribute to financial stability and good performance;
- Net-profit margin and sales revenue can be confirmed as major financial performance indicator for the B2B industry.

7.4 Hypotheses discussion

The last section discussed findings within the CRM and BP constructs as well as their relationships between each other. This section focuses on the hypotheses discussion. The discussion is based on the hypotheses development in section 4.3, all corresponding findings from chapter 6 and mainly on the five-dimensional research model with its distinctions by organisational characteristics. While the discussion about H0 will give a broad overview about the findings, the discussion about H1 – H4 will be based on four steps. The first part introduces the empirical contributions and compares them with key articles to sort the contributions of this study into the body of knowledge. The second part of this section discusses the contributions and provides interpretations based on the a-priori assumptions. Thirdly, the differences between the organisational characterised will be taken into account. Fourthly, the differences between the research models as well as methodological aspects are taken into consideration. Finally, the key statements of the discussion are summarised at the end of each
section. The structure of this section follows the numbering of the hypotheses; i.e. the hypotheses will be discussed one after the other starting with H0.

7.4.1 **H0: Systematic CRM implementation positively affects BP**

Firstly, H0 will be discussed in this section. To do so, the uni-dimensional research model (see section 6.7) represents the main explanation for this hypothesis and the following hypotheses 1 – 4 add detailed explanations for H0. Overall, H0 can be confirmed as CRM has a moderate impact on BP (SRW = 0.56, S.E: = 0.07, C.R. = 10.19) being statistically significant at p = 0.001. According to the model, CRM represents roughly 1/3 of the business performance (R² = 0.32).

With that said, this study is consistent with many other authors who argue that CRM has a (positive) impact on CRM, especially when implementing it in a systematic way considering key dimensions. Even though, the study confirms the main association between CRM and BP, only some authors confirm the direct effect of CRM on BP (e.g. Hendricks et al., 2007; Reinartz et al., 2004; Schilke et al., 2009). Moreover, most of the studies reveal only one aspect of business performance and not all three at once. Only a few, such as Reinartz et al. (2004) discuss multiple dimensions of the business performance impact. Moreover, the study adds to measurement frameworks such as the CRM Scorecard H.-S. Kim and Kim (2009). Following, a short summary will be given, based on the theoretical findings of section 3.3 and the three BP dimensions will be discussed on a broader level first:

1. From an internal efficiency perspective, this study confirms some aspects, such as enhanced collaboration, better customer understanding and the overall process efficiency. On the other side, higher employee satisfaction could not be associated as corresponding measures were not included within this study. Hence, the findings within the dimension of internal efficiency are partly in line with existing literature (Josiassen et al., 2014; Li & Mao, 2012; Reinartz et al., 2004; Michael Rodriguez & Honeycutt, 2011).

2. From an external customer satisfaction perspective, this study confirms the impact on knowledge management and on the relationship to the customer resulting in higher customer loyalty. However, no confirmation could be found regarding the commitment of employees or for the improved customer acquisition. Hence, the findings within the dimension of external customer satisfaction are partly in line
with existing literature (Kim et al., 2003; Long et al., 2013; Mithas et al., 2005; Reinartz et al., 2004).

3. From a financial perspective, it could be confirmed that CRM impacts outcome-oriented KPIs such as turnover or net-profit margin. However, the internal cost-perspective could not be associated with CRM as the results very not reliable. Hence, the findings within the dimension of financial performance are partly in line with existing literature (Coltman et al., 2011; Krasnikov et al., 2009; Rapp et al., 2010).

Besides these three dimensions, many mediating elements are being discussed in the literature (see section 3.4). This study has excluded the discussion about indirect effects for two major reasons. First, the literature does not clearly differentiate between internal and external effects of CRM on BP. For instances, customer knowledge as a potential area of influence is being discussed as direct effect on internal process efficiency but also considered to be a mediating element. Second, this study asked the participants to evaluate their business performance in comparison with their nearest competitor(s) assuming that the effect of mediating elements will be minimised with this questionnaire technique. Thus, the study does not provide any different findings for mediating elements compared to the existing literature (Mithas et al., 2005; Rapp et al., 2010; Rivard et al., 2006; Schilke et al., 2009; Zeynep Ata & Toker, 2012).

After having introduced some of the key findings for H0. The next sections will discuss the findings in greater detail with regards to the specific CRM construct.

7.4.2 H1: CRM Strategy positively affects BP

This section discusses the findings and interpretations of H1 and compares them with existing literature before providing an interpretation of these in comparison to the a-priori assumptions. H1 revealed the following contribution:

- **Empirical evidence, that CRM strategy has no effect on BP.**

Based on this, the study contributes with the empirical finding and the key statements from the discussion of this section. In comparison to other studies this finding is rather contrary. Thereby studies vary a lot and offer findings from specific case studies or from theoretical
contributions. Most studies argue, that CRM strategy has a positive impact on BP, directly or indirectly.

Schilke et al. (2009) found that CRM is mediated through the overarching business strategy and the commoditization of the industry where it has been implemented. Hence, the strategy of the organisation (and the CRM strategy) impacts BP indirectly. This finding is supported by Chen and Popovich (2003), as they revealed that the implementation of CRM is more likely to fail if the strategy is not incorporated. Payne and Frow (2006) are in line with these arguments and extend it further, stating that CRM strategy is essential, not only for the software implementation but also for the processes. All these findings are rather qualitative evidence, which are in line with the a-prior assumptions of this study. However, the quantitative findings of this study do not provide further support but a strong correlation between CRM software and the actual implementation could be verified. With that said, it seems to be argumentative, that CRM strategy influences BP only indirectly and organisations cannot rely on the strategy definition itself but must invest into a structured implementation. In other words, if a CRM strategy is defined and well implemented it has a positive impact on the planning and implementation of the software, which improves the processes efficiency and the overall BP. A practical example for this argumentation is provided by Wu and Lu (2012) who argue that the relationship marketing (which can be considered as part of the CRM strategy or processes) impacts BP. While their study is specified for the Taiwanese hotel industry, Bohling et al. (2006) provide further evidence that organisations must be capable to transfer their CRM initiatives into the overall business strategy. For these arguments, this study could not provide further support. However, the correlation between the implementation and the success measurement (see H4) implies that organisations perform better, if they follow-up with their CRM initiatives. Hence, it seems that the actual strategy definition can only be considered as initial step and the strategy execution and controlling is at least equally important. For these reasons, German B2B organisations should focus on their CRM strategy. Even though the strategy definition is not directly associated with BP, it supports organisations in achieving their CRM targets, which positively impact the overall performance of the company. Table 7-2 compares the finding of H1 with existing literature summarising agreements and disagreements.
Table 7-2: Comparison of findings for H1

<table>
<thead>
<tr>
<th>H1 - Findings</th>
<th>Agreement</th>
<th>Disagreement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H1</strong>: CRM strategy has no effect on BP (SRW = -0.02 / p=0.83).</td>
<td>Most studies argue, that CRM strategy has a positive impact on BP: No empirical support / agreement could be identified, especially not in the German B2B industry.</td>
<td>a. Relationship marketing (as part of a CRM strategy) influences BP within the Taiwanese hotel industry (Wu &amp; Lu, 2012)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. CRM implementations tend to fail more often, if strategy is not considered (Chen &amp; Popovich, 2003)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. CRM does not impact BP directly, but is mediated through business strategy and influenced by industry commoditization (Schilke et al., 2009)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. CRM initiatives rely on the ability of an organisation to integrate it into the overall (marketing) strategy (Bohling et al., 2006)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>e. CRM strategy is essential to implement CRM software (Payne &amp; Frow, 2006)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>f. Business strategy and customer strategy are key to develop CRM processes (Payne &amp; Frow, 2005)</td>
</tr>
</tbody>
</table>

After having made a first comparison of the finding with the existing literature, the a-priori assumptions are going to be confronted and interpreted with the results. Lastly, key statements are formulated to provide an explanation for the consent or deviation between the assumptions and the results. As the hypothesis could not be supported, the underlying key assumptions cannot be confirmed either for the B2B industry in Germany:

First, it was assumed that **customer centricity** increases customer satisfaction and – most importantly – this must be considered within a CRM strategy. As there is no direct impact from CRM strategy on BP, it can be argued that customer centricity initiatives do not need a dedicated CRM strategy but are considered within the overarching business strategy. Another explanation might be in contradiction with many other authors claiming, that strategy is a key component for CRM success (Akter et al., 2016; Bull, 2003; Campbell & Cunningham, 1983; Roberts et al., 2005). If a strategy for CRM is vital for the success of CRM but the CRM strategy has no impact on BP, the CRM strategy does not considered BP and is being managed on its own. This argumentation can further be supported, as the CRM strategy is not embedded into business strategy according to the measurement construct.

Another assumption was that the **alignment of internal activities and external customer processes** results in higher process efficiency. This might also be a potential area of
explanation, as such an alignment requires a strategic decision to do so. If German B2B organisations are not adjusting their business according to customer requirements, a CRM Strategy cannot have any influence on business performance. Hence, it can be assumed that the business strategy of these organisations is not heavily influenced by customers (i.e. CRM activities) but influenced by other factors. This explanation must be interpreted with caution, as it does not reflect the common sense of the actual literature arguing that all CRM strategies try to maxims the customer output, even though authors provide different perspectives of CRM strategy (see section 2.4).

Based on the previous argument, it was assumed that organisations need a strategy to unify CRM decisions around investments and efficiency. On the one hand, investments should be made to be attractive for customers on the other hand, efficiency must be ensured by focusing on internal improvements. As the study suggests that CRM strategy has no impact on BP, it can be argued that these contractionary targets are managed isolate. In other words, organisations are not strategically balancing between CRM efficiency and investment measures. Without this strategic consideration, those measures are initiated and managed re-actively. Consequently, they do not impact business performance.

Moreover, it was assumed that organisations need a holistic consideration of their CRM strategy, so that it is not seen as IT project nor should it be a pure marketing or sales initiative. Previous studies have found, that the implementation of CRM is more likely to fail (Chen & Popovich, 2003). As such a holistic view is not focused by organisations and the CRM strategy seems to be more influenced by business departments (see section 7.2.1), this study was not able to find any association to business performance. This is in contrast with other, more specific studies in this area. For instances Wu and Lu (2012) found that relationship marketing influences all BP dimensions within the Taiwanese hotel industry. This cannot be confirmed for the German B2B industry. Another reasoning might be the missing incorporation of external measures. If an organisation develops a CRM strategy but does not link it to the overall business strategy, it becomes very hard to assess the impact on BP.

Based on the distinction between the organisational characteristics, the study found an interesting difference. A note of caution is due here, since the data does not offer statistical significance, but it can be used as source for a possible interpretation. Within small
organisations the impact did not change significantly compared to the initial research model (SRW -$\Delta$ 0.07). When analysing large organisations, it could be interpreted that CRM strategy has a weak impact on BP (-0.33), as it changed compared to the initial model quite a bit (SRW -$\Delta$ 0.31). This reasoning is surprising for several reasons. First, it implies that larger organisations invest more effort in building a formal CRM strategy and that these organisations evaluate the impact on BP. This sounds logical, as smaller organisations may not spent as much time on a strategy for CRM but rather react more intuitive to market circumstances. However, if this is interpretation applies, it also indicates that the association is negative for large organisations. In other words, if a large organisation has developed a CRM strategy (by incorporating customer groups, sales channels and newest technologies) the business performance decreases. With that said, it must be highlighted again, that the data is statistically not significant.

On the other hand, a small difference between organisations which are family-owned or not can be interpreted. Within non family-owned organisations the impact did not change significantly compared to the initial research model (SRW -$\Delta$ 0.05). Also, for family-owned organisations the impact did not change decisively compared to the initial research model (SRW +$\Delta$ 0.18). Nevertheless, the tendency to a positive impact (+0.16) can be interpreted. If family-owned organisations with a CRM strategy perform better, it might be argued that these organisations are more cautious when it comes to the implementation of strategies due to their ability to adopt and change faster. Combining this argument with the interpretation of large organisations, it may make sense that large organisations are ‘parallelised’ by their strategy, because they cannot adopt it nor can they implement it quick enough.

Comparing the 4- and 5-dimensional research models, no mentionable differences could be identified. Finally, it must be emphasised that this study did not ask for the existences of a CRM strategy at all. It was assumed that organisations are having a strategy and the study aimed to assess how organisations have designed and implemented their strategy (i.e. which aspects are included).
In conclusion the following key statements can be summarised when discussing H1:

- B2B organisations do not implement CRM measures to assess the impact on BP;
- Larger organisations seem to spend more for CRM strategy, however the impact on BP is not positive because they are not able to adopt fast enough and fail to implement;
- Family owned business with a CRM strategy tend to improve their BP, as they can change quickly and implement the strategy successfully;
- As the study assumed that organisations have a CRM strategy in place, it could not verify whether this is the case.

7.4.3  H2: CRM Implementation and planning positively affect BP

This section discusses the findings and interpretations of H2 and compares them with existing literature before providing an interpretation of these in comparison to the a-priori assumptions. H2 revealed the following contributions:

- **Empirical evidence, that CRM planning and implementation has no effect on BP.**
- **An implication, that CRM planning and implementation has a negative impact on BP of family-owned businesses.**

Based on this, the study contributes with the empirical finding and implications as well as with the key statements from the discussion of this section. In comparison to other studies these findings are partly congruent and partly contrary.

Some authors could not provide support for the impact of CRM on BP, such as Josiassen et al. (2014) who argue, that CRM systems do not impact the performance of hotels. In addition, Hendricks et al. (2007) discuss that there is only a little effect on the profitability and stock-price of organisations that have implemented CRM. On the other side, many studies found an association between CRM implementation and BP and thereby confirm that ‘CRM pays off’. All of them – independently from the industry they are researching – agree, that other factors influence this relationship and therewith support that CRM and BP are not monocausal related to each other. Soch and Sandhu (2008) contribute by stating, that size, age and industry of the organisation has an influence on the effect of CRM and Krasnikov et al. (2009) endorse these findings within their US banking study where they figured out, that CRM decreases cost.
efficiency but increases profits. Evidently, the association between CRM implementation and BP does not only depend on other internal factors but also on the market circumstances (especially the industry). With that said, it can be argued that CRM-intensive B2B organisations (e.g. retail banking or sales intensive companies) might benefit more from a well-implemented CRM system. As an example, Michael Rodriguez and Honeycutt (2011) investigated the impact of CRM on the sales collaboration and figured out that CRM enhances collaboration and thereby improves the sales performance. Such an increased sales performance has an obvious impact on the BP of sales-intensive organisations but might not be critical for less sales-intensive organisations.

By the same token, some industries might not benefit from the implementation because the industry (i.e. customers or the internal processes) are not demanding CRM that much. For instances, hotels are less (outside) sales-intensive and internal processes might not benefit much from the implementation of a CRM system. Besides the industry of the affected organisation, other factors are influencing BP as well. While Reinartz et al. (2004) define technology and organisational alignment as key factors, Coltman et al. (2011) argue that CRM can only be successful and impactful with a solid business architecture and human analytics. Both studies support that organisations should not only focus one aspect (e.g. the software itself) but plan and manage its CRM implementation holistically. This study could not find direct support for the impact of CRM planning and implementation which might be justified by the high industry diversity of the study or the fact, that German B2B organisations are rather product-related and less sales-focused. At the same time, a strong correlation between the implementation and the usage of aCRM could be found (see H3) which leads to the conclusion, that German B2B organisations are not benefiting from the actual implementation but from the usage of aCRM. In other words, they should implement CRM and thereby focus on the development of analytical functionalities instead of setting up a CRM system, that only digitalises existing processes.

Looking at the ownership of the organisations, an implication could be found that the implementation of CRM might have a negative impact on BP within family-owned organisations. One can argue, that family-owned organisations have less resource and capabilities to implement a CRM system properly and therefore they have a higher risk in
being distracted from the daily-business. Besides the ownership, size of an organisation might be also relevant. Thereby, the findings from Alshawi et al. (2011) suggest, that the size of the organisations has no impact on the implementation of CRM. In conclusion, family-owned organisations might have a higher resource-risk and therefore need to pay more attention on the planning of the implementation. Equally as with CRM strategy, all organisations should focus on the implementation itself, as it highly correlates with the availability of analytical functionalities. If done properly, organisations will benefit from these functionalities and BP is affected positively. Table 7-3 compares the findings of H2 with existing literature summarising agreements and disagreements.

Table 7-3: Comparison of findings for H2

<table>
<thead>
<tr>
<th>H2 - Findings</th>
<th>Agreement</th>
<th>Disagreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2: CRM planning and implementation has no effect on BP (SRW = 0.03 / p=0.83).</td>
<td>• Firms (here: Hotels in Slovenia) with higher CRM system investments or expenses do not perform better (Josiassen et al., 2014)</td>
<td>• CRM positively influences firm performance, but it depends on various factors, such as size and age of the business, industry, etc. (Soch &amp; Sandhu, 2008)</td>
</tr>
<tr>
<td>• Implication, that CRM planning and implementation has a negative impact on BP of family-owned businesses (SRW = -0.41 / p = 0.08)</td>
<td>• CRM implementations have a little effect on profitability and stock-price (Hendricks et al., 2007)</td>
<td>• Implementation of CRM processes has a moderate positive association with objective BP (Reinartz et al., 2004)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Superior CRM capabilities are based on human analytics and solid business architecture and positively impact BP (Coltman et al., 2011)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• CRM implementation decreases cost efficiency but increases profits in US banking industry (Krasnikov et al., 2009)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• CRM usage increases internal collaboration and sales performance in B2B organisations (Michael Rodriguez &amp; Honeycutt, 2011)</td>
</tr>
</tbody>
</table>

After having made a first comparison of the finding with the existing literature, the a-priori assumptions are going to be confronted and interpreted with the results. Lastly, key statements are formulated to provide an explanation for the consent or deviation between the assumptions and the results. As the hypothesis could not be supported, the underlying key assumptions cannot be confirmed either for the B2B industry in Germany:
First, it was assumed that a sound requirement definition has a positive impact on BP, especially on customer satisfaction. As the data does not show any association between CRM implementation and planning, it can be argued that the requirement definition might accelerate the project implementation, but this is not mapped with the actual BP. In other words, even if all requirements are clearly defined and the implementation itself was evaluated as successful, the study did not find an association between the implementation and BP. This might be due to the fact, that requirements from organisations are gathered in a structured way but they are not gathered from customers. Without involving the customers directly into the CRM implementation (i.e. their requirements) it cannot have any impact on customer satisfaction. On the contrary, internal requirements may be defined and implemented in a structured way but organisations are not comparing the affected business processes after the implementation. Hence, a subjective impression might confirm that the implementation was successful, but no objective comparison was made. Even if such a comparison was made, the next step would be to measure the outcome of the internal efficiency improvement. Such an outcome could be a shorter process lead time, the reduction of costs or the increase of turnover. Thus, it can be assumed that organisations are not measuring such improvements.

Secondly, it was assumed that a good training programme as well as dedicated change and communication management increases the success of the implementation and consequently enhances the process efficiency. Previous studies argue, that employees are guided and motivated if there is a good change management in place (Alshawi et al., 2011; Šebjan et al., 2016; Shum et al., 2008). In addition, the engagement of top management and the corresponding communication of CRM benefits are reported as critical success factors (Goodhue et al., 2002; Seyal et al., 2007). However, none of these studies have assessed the impact on BP, because they focused on the project-oriented success of the implementation (e.g. user acceptances). Hence, it can be argued that organisations don’t assess the process efficiency before and after the implementation. Also, it can be argued that the training, change management and communication are vital for the actual implementation but not essential for usage of CRM in the long-run. For instances, if a CRM implementation fails (due to bad training, change management and communication), the users must use it anyway and
therefore it has no impact on BP. In conclusion, this study could also not find an association
between the successful implementation of CRM and BP for the German B2B industry.

Lastly, it was assumed that a dedicated project management ensures that an implementation
remains in time and budget and therefore positively impacts BP, especially the financial
performance. As the study could not confirm this assumption, it can be argued that most
organisations provide a dedicated project management and therefore it does not impact BP at
all. However, one could counter that most of the CRM implementations fail due to missing
(or bad) project management. In both cases, the impact on BP could not be confirmed by the
data which is surprisingly but can be explained by the fact, that project management focuses
on the implementation itself but ignores the impact of the implemented software on the overall
business performance.

Interpreting the different results from the organisational characteristics an important finding
is the difference between family-owned and non-family-owned organisations. The study
found a moderate negative impact from CRM implementation and planning on BP for family-
owned organisations (SRW = -0.41, S.E: = 0.23, C.R. = -1.78) on an acceptable significance-level
of p = 0.08. In contrast, the study could not find statistical significance for non-family-owned
organisations with p=0.20. Nevertheless, the positive tendency (SRW = 0.22, S.E: = 0.19, C.R. =
1.29) will be interpreted also when discussing this finding. Moreover, the differences between
small (SRW = 0.04, S.E: = 0.18, C.R. = 0.21, p=0.83) and large organisations (SRW = 0.28, S.E: =
0.34, C.R. = 0.86, p=0.39) must be taken into consideration, even though they do not provide
statistically significant values.

First, it must be emphasised that these finding states, that organisations with a strong CRM
planning and implementation suffer in terms of BP, which can be explained by several reasons.
Family owned organisations are often small(er) organisations and therefore lack in terms of
skilled personnel. In addition, these organisations also implement CRM systems with existing
resources most of the times. Hence, project employees must cope with double work-load
without being qualified to do so. This argumentation can be supported by the tendency of
large-organisations where a weak positive impact (SRW = 0.28) can be interpreted. Obviously,
the double work-load has an impact on the daily business of project employees from small(er)
and family-owned organisations. For instances, if a sales employee must plan and implement
a CRM system his sales performance might suffer which has a direct impact on BP. In contrast, the tendency for larger and non-family-owned organisations is weak but positive. Hence, it can be argued that larger organisations are able to staff such projects better (e.g. with external resources) and therefore their daily business does not suffer from the CRM implementation.

As the main finding of this study is, that organisations are benefiting from CRM (in the long-run) the moderate weak impact for family-owned businesses might be explained by the time as well. If a family-owned organisation implements CRM and it is not accepted from the very beginning, these organisations often stop improving it. Hence the CRM system creates more work and the user acceptances is low. At this point, larger organisations are investing (more) resources to overcome this first stage of ‘teething trouble’ and thereby improve their CRM system. As a result, the implementation has a positive impact on BP (in the long-run) even if it had a negative impact in the beginning.

Comparing the 4- and 5-dimensional research models, no mentionable differences could be identified. Finally, the explanations from above must be interpreted with caution, as only the moderate weak impact from CRM planning and implementation was statistically significant and all other data was used as tendency for interpretation.

In conclusion the following key statements can be summarised when discussing H2:

- CRM planning and implementation has no effect on customer satisfaction, because organisations are not including customer requirements;
- Internal process efficiencies are not measured after a successful CRM implementation;
- Training, change management and communication is essential for the successful implementation but does not necessarily impact BP;
- A successful implementation (i.e. project management) does not consider BP at all but focuses on project-related success measures (i.e. delivered in time & budget);
- CRM planning and implementation negatively impacts business performance for (small) family-owned businesses, due to unqualified personnel, double work-load and missing time for their daily business;
- (Small) Family-owned businesses often stop the implementation after a short time-period and thereby realise a negative impact on BP.
7.4.4 H3: Usage of aCRM technologies and adoption of business applications positively affect business performance

This section discusses the findings and interpretations of H3 and compares them with existing literature before providing an interpretation of these in comparison to the a-priori assumptions. H3 revealed the following contributions:

- **Empirical evidence, that the usage of aCRM technologies has a moderate positive effect on BP, especially for small organisations and family-owned organisations**
- **Empirical evidence, that a high adoption of aCRM business applications has no effect on BP**

Based on this, the study contributes with the empirical finding and implications as well as with the key statements from the discussion of this section. In comparison to other studies these findings are partly congruent and partly contrary.

First, this study found that the usage of aCRM technologies impacts BP, especially for small and family-owned organisations. Most other studies agree with this finding, so that it can be concluded that the implementation aCRM technology positively impacts BP. In detail, Latusek (2010) found that B2B marketing practices benefit from analytical applications and profitability can be increased. Besides the increase in profitability, technology also impacts customer relationships (Rapp et al., 2010). Thereby organisations can extend their CRM from being ‘only’ operational towards being an integrated operational and analytical system, that helps managing customer and make business critical decisions based on data (Kelly, 2000). Even though other factors are influencing the implementation of aCRM technologies, specific cases show further support for the findings of this study. For instances, Chang et al. (2010) have found that CRM technology impacts the performance of Korean organisations. Combining these insights from other studies with the specific findings of this study, it can be concluded that especially small and family owned organisations are benefiting from aCRM technology. This finding seems logically in the first place but is intriguing when comparing with the findings of H3b.

This study could not state that the adoption of these aCRM applications in business departments impact BP. In other words, the technical implementation has a direct effect on BP.
but the degree of usage cannot be associated with BP. Xu and Walton (2005) support this by stating that organisations have not made use of the capabilities of aCRM, which means that they have (to some limited extend) implemented the technology but are not using it, yet. Besides this argument, most other scholars are disagreeing and state, that the adoption of aCRM application has an impact on BP. Šebjan et al. (2016) highlight the importance of innovation, technology and process stating that these factors are essential for the success of aCRM and its impact on the organisation. After having implemented and adopted the aCRM applications, Mithas et al. (2005) argue that customer knowledge can be improved and affect customer satisfaction positively. With these disagreements, the question occurs why organisations seem to be technically capable of using aCRM applications, but business departments are not adopting them properly even though it has a positive impact on the performance and profitability (Rivard et al., 2006). One possible explanation might be, that organisations are benefiting more from the approach to provide technologies to the business departments instead of pre-define the actual application which must be used. For instances, if an organisation provides data visualisation technology (i.e. a business intelligence software like PowerBI) it has a higher effect on BP, because they can adopt it to their needs (e.g. building their own dashboards) instead of having to use a pre-defined dashboard. Looking at it from the other side, it can be argued that due to bad implementation practice (i.e. missing change or project management) the software is technically available, but organisations are not exploiting their full potential. Hence, it might be the case, that an organisation has implemented CRM with base functionalities, but the real business-valuable applications were not delivered because the project stopped. Consequently, many CRM users are not adopting the system and still manage their customer data etc. in separate systems (e.g. excel files). In conclusion, organisations must focus not only on the delivery of the technology but much more on the definition and delivery of business-valuable applications with that technology. These findings are discussed further in the next paragraphs, after table 7-4 compares the findings of H3 (a & b) with existing literature summarising agreements and disagreements.
### Table 7-4: Comparison of findings for H3a and H3b

<table>
<thead>
<tr>
<th>H3a: Usage of aCRM technologies has a moderate positive effect on BP (SRW = 0.20 / p=0.04), especially for • small organisations (SRW = 0.25 / p=0.05) and • family-owned organisations (SRW = 0.48 / p = 0.001)</th>
<th>Agreement</th>
<th>Disagreement</th>
</tr>
</thead>
</table>
| • B2B marketing can benefit from analytical applications (here: discrete choice modelling) and thereby increase profitability (Latusek, 2010)  
• CRM technology-capabilities (and customer orientation) have a positive effect on customer relationship (Rapp et al., 2010)  
• The Usage of CRM technology impacts the performance of Korean organisations and is mediated by different factors (W. Chang et al., 2010)  
• By deploying aCRM, organisations can achieve better customer management instead of using operational CRM as one-to-one marketing tool only (Kelly, 2000) | Most studies argue, that technology has a positive impact on BP: No empirical disagreement could be identified, especially not in the German B2B industry |

<table>
<thead>
<tr>
<th>H3b: High adoption of aCRM business applications has no effect on BP (SRW = 0.12 / p=0.47)</th>
<th>Agreement</th>
<th>Disagreement</th>
</tr>
</thead>
</table>
| • Many organisations have not made use of aCRM, yet. Some (limited) aCRM applications are limited to large organisations (Xu & Walton, 2005) | A strong IT support has a positive impact on SMEs market performance and profitability (Rivard et al., 2006)  
• CRM applications improve customer knowledge and thereby positively affect customer satisfaction (Mithas et al., 2005)  
• Organisations that are innovation, technology and process-driven are more likely to successfully implement analytical CRM applications (Šebjan et al., 2016) | |

After having made a first comparison of the finding with the existing literature, the a-priori assumptions are going to be confronted and interpreted with the results. Lastly, key statements are formulated to provide an explanation for the consent or deviation between the assumptions and the results. As one sub-hypothesis could be supported (H3a) and the other could not be supported (H3b), the underlying key assumptions can be partly confirmed and will be discussed for both sub-hypotheses separately:
H3a: **Usage of aCRM technologies positively affect business performance**

It was assumed that the aCRM technologies must be available and employees must be aware of them, before they can be used within business applications. Hence it was argued, that the availability and usage of aCRM technologies increases BP, after (technically) deploying them and make users work with these technologies. Literature partly confirms this assumption, as for instances Chang et al. (2010) confirm that CRM technology impacts organisational performance and is mediated by marketing capabilities. Other studies investigate different angles, but most scholars argue that CRM technology positively impacts BP even though the circumstances and mediating factors vary a lot (Kevin et al., 2014; Ranjan & Bhatnagar, 2011; Rapp et al., 2010; Salojärvi & Sainio, 2015). The results of this study confirm this association, as the sub-hypotheses H3a mainly contributes to the impact of aCRM to BP. As the technology has been assessed with data visualisation, forecasting and predictive analytics, the explanation can be built on these technologies.

First, **data visualisation** helps organisations to make use of their data. With an increasing amount of data, such visualisations become increasingly important and therefore contribute to the business performance. Even though data visualisation might not be considered as ‘technology’ itself, business intelligent software or other tools which help to make sense out of the data help (with their visualisation) are being discussed within the literature. The result of this study further supports the idea, that BI tools enable organisations to make better decisions and therefore improve their business performance. Consequently, the assumption (section 4.3) that data visualisation increases mainly process efficiency and financial performance can be supported with the generated results.

Secondly, it can be argued that **forecasting** supports organisations in their ability to re-adjust their strategies and business activities. For instances, if a sales region is underperforming, forecasting may assist in assessing the actual end-of-year results. Based on this, additional marketing activities (e.g. price reductions or advertisement) can be pushed which helps the sales region. Without simple forecasting technologies such corrective measures could not be initiated. As most of today’s CRM software provide these technologies, without any development effort, it can be argued that end-users are making use of them. Based on these built-in technologies the assumption can be confirmed that forecasting mainly improves
process efficiency, because manual calculations are not necessary. Moreover, it also impacts customers, as marketing campaigns or price reductions may lead to higher customer satisfaction and therefore increases customer loyalty.

Lastly, **predictive analytics** can be seen as advanced forecasting. However, some uncertainties arise with PA, as German B2B organisations have different definitions and understating of predictive analytics (cf. section 2.6.5). Hence, the result needs to be interpreted with caution but can be explained since organisations are trying to predict future business scenarios. This might not be based on the technical implementation of predictive analytics but due to calculations of CRM users who try to make an educated guess about future competitors, sales figures, product launches etc. These internal predictions allow organisations (like with forecasting but more systematic and future-oriented) to streamline their marketing activities (e.g. systematically suggest customers cross- and up-selling products) and internal processes. With that said, these results confirm that PA ‘approaches’ have a positive impact on all three dimensions of business performance.

Looking at the different findings based on the organisational characteristics, it can be summarised that the impact is positive weak for small organisations (SRW = 0.25) and positive moderate for family owned organisations (SRW = 0.48). Both are statistically significant with p=0.05 for small organisations and p=0.001 for family owned organisations. The study does not provide statistically significant results for large and non-family owned organisations and both do not impact BP. This rather surprising result suggests that large and non-family owned organisations are not able to benefit from analytical technologies. Especially when it comes to predictive analytics this is somewhat troubling because larger organisations should be able to invest in new technologies much better, due to their knowledge and investment abilities. On the other side, it may be argued that smaller and family owned organisations are more efficient when it comes to the actual implementation because they are able to identify the right application for the technologies. Furthermore, the strongest impact was found for family-owned businesses which again may be explained by the speed of innovation and the ability to decide, invest and implement very fast. In conclusion, the results show that all three aCRM technologies are good indicators for the usage of analytics within CRM, which impacts BP.
Thereby it is not necessary that IT department makes specific technologies available, but it is essential to use them in real-world scenarios.

**H3b: High adoption of aCRM business applications positively affect business performance**

It was assumed that the aCRM applications are key to impact business performance. As discussed above, the differentiation between technologies and actual applications seems to be an uncertainty of understanding. Hence, the results of this study do not confirm this association, as the sub-hypotheses H3b does not contributes to the impact of aCRM to BP. As these applications have been assessed with analytics about customer activities, the analysis of customer loyalty, cross- and up-selling and reasons for customer complaints the following discussion will be built on these applications.

In alignment with other studies (e.g. Khachaturyan (2012)) it was assumed that analysing customer activities are beneficial for customer satisfaction and the financial performance because many customer activities are unsystematically executed. Having good analytical tools in place, that suggest the next best action towards the customer may result in higher customer satisfaction and lowers the amount of necessary activities. Also, it was assumed that analysing customer loyalty and reasons for customer complaints help organisations to identify disloyal customers and market them with better offers or get to know why they are not purchasing anymore. Consequently, this should result in higher customer satisfaction and financial performance. Lastly, it was assumed that the analysis of cross- and up-selling potential results in better customer satisfaction and therefore in higher turnover with less manual analytical processes. If a CRM system can suggest cross- and up-selling products systematically sales people can easily suggest these products.

All these assumptions could not be confirmed by the study. This rather disappointing finding can be explained by several aspects. First, as stated earlier, the participants did not really differentiate between the business application (e.g. analysing cross- and up-selling potential) and the actual technology (e.g. forecasting). Second, organisations are not providing analytical applications in a systematic way to their employees. In other words, most of the employees are building their own applications based on their knowledge and available technologies. This leads to an unstructured way of analysing data and when consolidating them (e.g. for management meetings) the results may vary. Third, it may be argued that wrong data is
captured before performing the actual analysis. Consequently, all analytical applications will generate wrong results and these wrong results will not impact business performance. Lastly, it can be assumed that, if the results are correct, they are not incorporated into company-wide measures. For instances, if 10% of all customer complaints are due to a non-existing 24/7 support, it will still be a difficult decision to provide that support due to labour protection, increasing personnel costs, etc. With that said, it can be summarised that none of the applications impact business performance as assumed.

Analysing the differences according to organisational size and ownership, no statistically significant result could be generated with p-value being between \( p = 0.18 \) (large organisations) and \( P = 0.75 \) (family-owned organisations). However, looking at large organisations (which provide at least a tendency for further interpretation), a strong positive relationship can be assumed. This finding can be explained by the fact, that large organisations are trying to standardise the applications and act more systematically data-driven in comparison to smaller organisation. Hereby, they are implementing standardised reporting structures across their business units, which allows them to extract data from all business areas and make use of these results within strategic decision making. Thus, a suitable reasoning for this finding might be that aCRM standardisation helps organisations to make use of the data and improve business performance.

Comparing the 4-dimentional and 5-dimensional research models, the differences between the sub-hypotheses have been elaborated within this section. Finally, the main hypotheses could be confirmed and aCRM impacts business performance.

In conclusion the following key statements can be summarised when discussing H3:

- aCRM has a moderate positive impact on BP, based on the available technologies such as forecasting, data visualisation or predictive analytics;
- aCRM technologies have a weak positive effect on small organisations due to their ability to quickly identify fields of applications;
- aCRM technologies have a moderate positive effect on family-owned organisations due to their ability to quickly make decisions and investments as well as to do the actual implementation;
• Larger and non-family owned organisations do not increase their business performance with aCRM technologies;
• aCRM technologies do not need to be developed by IT departments, as long as they support CRM users in their daily business;
• aCRM applications do not impact business performance, due to an inconsistent definition of applications and technologies;
• aCRM applications are not used consistently in terms of standardised analytical reports, data quality and missing company-wide measures;
• Large organisations may be able to improve their business performance by using aCRM applications due to a higher degree of standardisation.

7.4.5 H4: CRM success measurement positively affects BP

This section discusses the findings and interpretations of H4 and compares them with existing literature before providing an interpretation of these in comparison to the a-priori assumptions. H4 revealed the following contributions:

• **Empirical implication, that CRM success measurement influences BP, especially for small and family-owned organisations**

Based on this, the study contributes with the empirical finding and implications as well as with the key statements from the discussion of this section. In comparison to other studies these findings are mostly congruent.

CRM success measurement was identified as key success factor within the literature review. Key studies, such as H.-S. Kim and Kim (2009) measurement framework for CRM argue that the measurement is essential for the success of the implementation. More specifically O’Sullivan and Abela (2007) contributes with his study by measuring marketing performance and comparing them with profitability and stock returns. Due to the impact of CRM on the marketing performance, their study can be seen as further support for the findings of this study. With that said, organisations should assess their CRM performance to maximise the impact on BP. A similar argumentation can be found in the work of Gumnessson and Gunmesson (2004). They have measured relationship marketing using CRM and found a positive impact on the B2B marketing practice, which impacts the return-on-relationship.
Besides the relationship marketing, all sales activities are important for the quality (and return) of customer relationships. From a sales perspective, it is also important to measure the impact of CRM and therefore derive clear customer activities or corrective measures within the sales department. To do so, Li and Mao (2012) have found that CRM can help to improve the internal sales control of an organisation and therewith contributes to the success of the company. These three examples show specific support for the findings of this study, which imply that the success measurement of CRM influences BP. However, they do not specify in term of organisational size or ownership. As this study found, that CRM success measurement helps specifically small and family-owned organisations, it can be argued that these organisations are more sensitive with their investments. Especially family-owned organisations are often managed by the family itself and therefore projects are controlled intensively. Small organisations on the other side, might also be more careful with the actual project set-up of a CRM implementation and therefore focus specifically on key elements of it. As a consequence, these implementations are rather short-term oriented and achieve financial or processual benefits faster that large-scaled CRM implementations. This is also supported by the high correlation between CRM success measurement and the actual implementation of the software. In conclusion, organisations of all sizes should incorporate a specific and suitable measurement framework within their implementation practice. By doing so, they have a stronger control of the outcome and can intervene even in a running project, to react to new circumstances (e.g. change of requirements or project scope). Moreover, the project success (and therefore its impact on the overall BP) must be defined for such a measurement, which makes the goal of the implementation and usage of CRM transparent to all stakeholders. Finally, table 7-5 compares the finding of H4 with existing literature summarising agreements and disagreements.
Table 7-5: Comparison of findings for H4

| CRM success measurement influences BP (SRW = 0.28 / p = 0.08), especially for: | Agreement                                                                                                                                                                                                                                                                                                                                                           | Disagreement                                                                                                                                                                                                                                                                                        |
|                                                                                  | Organisations that are able to measure marketing performance increase their profitability and stock returns and therefore achieve better BP (O’Sullivan & Abela, 2007)                                                                                                                                                                                                                       | Most studies argue, that CRM success measurement has a positive impact on BP: No empirical disagreement could be identified, especially not in the German B2B industry                                                                                           |
| • small organisations (SRW = 0.39 / p = 0.02) and family-owned organisations (SRW = 0.59 / p = 0.04) | Relationship marketing can be measured with CRM to enhance B2B marketing and its impact on the return-on-relationship (Gummesson & Gunnesson, 2004)                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                      |
|                                                                                  | CRM usage improves internal sales management control and thereby enhances BP of a Chinese IT firm (Li & Mao, 2012)                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                      |

After having made a first comparison of the finding with the existing literature, the a-priori assumptions are going to be confronted and interpreted with the results. Lastly, key statements are formulated to provide an explanation for the consent or deviation between the assumptions and the results. As the hypothesis testing implies support, the underlying key assumptions can be confirmed, especially for small and family owned organisations:

It was assumed that monitoring cost improves financial performance, as it leads to cost reductions within the CRM implementation and the actual usage. For instances, if an organisation uses Software-as-a-service it should monitor the running license costs to avoid paying for unused licenses. However, as the costs aspects (i.e. CRM implementation and operating costs) were not included within the questionnaire (due to bad reliability and validity) this assumption cannot be confirmed directly. On the other side, a weak impact of CRM success measurement (in terms of measuring internal, external and financial improvements) can be confirmed by this study. Thus, it can be argued that the measurement of operating costs is included within the measurement of financial improvements even though the costs are not monitored directly. Independently from the exact measurement items, the main finding is the positive impact of CRM success measurement on BP. Thus, these findings are congruent with many studies that have similar findings for specific industries or countries. For instances, Ang and Buttle (2006) found that the performance of software (e.g. what users expect cf. to the actual software performance) is positively related to the company profitability.
Hereby they assessed the software performance of their marketing activities and thereby measured (partly) the CRM success.

With that said, it can be argued that organisations should measure their CRM success and assess if it really pays off. In practice, organisations are focusing a lot on CRM implementations and at the same time implementations are considered to fail most of the times. Having said this, it can be asked how organisations are assessing the success of CRM or its technical implementation. As many scholars, partly with specific case studies, confirm that CRM positively impacts BP (Chang et al., 2010; Hendricks et al., 2007; Rapp et al., 2010; Michael Rodriguez & Honeycutt, 2011) no specific attention was paid to the actual assessment of the success of CRM itself. Based on that, it may be concluded that organisations are assessing the success of CRM by comparing it solely with BP indicators, such as turnover or number of acquired customers. In contrast, CRM success may be assessed with CRM specific targets and if these targets are fulfilled it can be evaluated as a successful implementation or initiative before assessing the impact on BP, which will be noticeable in a later stage anyway. In conclusion, it explains how the success measurement of CRM impacts BP. Organisations that invest in the actual measurement of CRM success can communicate these successes or make transparent if something went wrong. In both cases, the organisation benefits. If something went wrong, further investments may be re-allocated or even stopped and if the CRM implementation was a success the company is able to communicate the success and its benefits for end-users within the organisation and may even invest into further improvements.

Another explanation for this important finding might be that the awareness will increase dramatically if an organisation measures (and communicates) the success of CRM. In other words, a CRM implementation or initiative needs the necessary attention not only to re-act and re-allocate resources but also to drive this change within the organisation. Moreover, the success measurement puts a specific pressure on the actual project. If a project team must communicate their successes (and failures) regularly they must focus more, and they must work together in an interdisciplinary team (i.e. IT and business department).

With this explanation, the differences between organisational size and ownership can be discussed. Hereby, it can be summarised that the impact is moderate for small (SRW = 0.39) and family-owned organisations (SRW = 0.59). Both are statistically significant with p=0.02
for small organisations and p=0.04 for family owned organisations. The results also show, that CRM success measurement does not impact BP for large (SRW = -0.36, S.E: = 0.62, C.R. =-0.63, p = 0.53) and non-family-owned organisations (SRW = 0.30, S.E: = 0.24, C.R. = 1.16, p = 0.25). These different results might be explained by the fact, that large organisations are assessing their CRM success already and therefore it has no impact on BP. In other words, the CRM success measurement is only an internal assessment for the project and no major changes will be applied based on this assessment. Hence, the project will be finished in time and budget and only for the pre-defined scope. Moreover, the business of these large organisations is widely spread, so that there is less dependency on the success of CRM. Another reasoning might be that small (and family-owned) organisations are working ‘closer’ with their customers and therefore a higher dependency on the success of their direct customer interactions. Also, they have less experience with CRM implementations or initiatives. Thus, it is essential for them to define their CRM targets and may re-adjust within the implementation ensuring the CRM success and thereby the impact on BP.

Comparing the 4- and 5-dimensional research models, no mentionable differences could be identified, and the hypotheses could be confirmed, that CRM success measurement impacts business performance, especially within small and family-owned organisations. In conclusion the following key statements can be summarised when discussing H4:

- CRM success measurement impacts business performance;
- Costs are not directly monitored within CRM success measurement but may be incorporated when assessing financial improvements;
- Organisations are measuring CRM success by comparing BP indicators before and after the CRM implementation or initiative;
- Assessing the success (or failure) of CRM itself allows organisations to communicate benefits or to re-allocate resources, both positively impacts BP;
- Communicating the success (or failure) of CRM itself allows organisations to drive change pro-actively and it forces the project team to focus on the actual outcomes;
- Small and family-owned organisations benefit from CRM success measurement, as they are less experienced with CRM and therefore need to re-adjust their implementations more often;
- The business performance of large organisations is less dependent on the CRM success, as their business is widely spread.

7.5 Conclusion

This chapter discussed and explained findings from chapter 6. First, the CRM and BP constructs were introduced, and the measures which have been incorporated to assess the corresponding construct were explained. Afterwards, the correlations between the constructs have been elaborated. The key statements (i.e. explanations) have been summarised within each construct. Next, the hypotheses were discussed by presenting the key findings and comparing their agreements and disagreements with key articles. Hereby the findings were presented first and the contributions were confronted with other key articles to sort them into the existing body of knowledge. By doing so, this section has articulated the findings but also provided interpretations for each of the hypotheses. Based on these findings, chapter 8.3 will present implications for knowledge and practice while chapter 8.4 will offer strategic implementations for organisations providing clear recommendations for German B2B organisations. Summarising this chapter H0 – as the overall hypotheses - was confirmed. Based on this, H1 – H4 were discussed in further detail. Hereby H1 could not be confirmed at all and H2 could be partly confirmed for small organisations. After that, the discussion around H3 and its two sub-hypotheses showed that H3a could be confirmed (especially for small and family-owned organisations) while H3b could not be confirmed. Finally, H4 was confirmed overall, especially for small and family-owned organisations. A summary of all key statements (i.e. interpretations) can be found in the appendix 16. The next chapter concludes this study.
8. Chapter – Conclusion

8.1 Introduction

Finally, this chapter concludes the study and synthesises its findings. Thereby it is structured in four main sections. First, the research findings are summarised to give an overview about the outcome of the research. Second, the contributions to knowledge, methodology and practice, which have been explained within this work, are presented. Third, managerial implications are discussed to guide practitioners on how to make use of the presented results in the real world. Fourth and last, limitations are outlined and possibilities for further research are illustrated giving other scholars the possibility to extend this research.

8.2 Summary of the research findings

This thesis has examined the impact from CRM on BP for German B2B organisations and thereby answered the main research question:

How do large German B2B organisations implement and use CRM and what are the effects on their business performance?

All three research objectives have been addressed. First, the study investigated how organisations identify and assess key CRM concepts within their organisations. Second, the impact of these constructs on BP was evaluated based on quantitative data. Third, research tools were developed (based on SEM) to further explore this relationship in future research.

Figure 8—1: Overview of research findings
Figure 8-1 provides an empirically validated framework, based on the conceptual framework and the research models, that summarises the main findings. Hereby, all relationships (i.e. correlations between the constructs) which have been evaluated to be very strong are included as well as the confirmed hypotheses H3 and H4. All residual relationships (i.e. below 0.80) and the non-confirmed hypotheses were excluded from this overview. With that said, the following key findings can be summarised.

**H3(+) Usage of aCRM technologies and adoption of business applications positively affect business performance (SRW = 0.38)**

The study revealed that the usage of analytical CRM has a strong impact on business performance. In specific, the usage of technologies contributes more to BP than the adoption of these technologies to specific business applications. For small and family-owned organisations aCRM impacts BP significantly, while large and non-family-owned organisations are not able to transform the usage of aCRM to better BP.

**H4(+) CRM Success measurement positively impacts business performance (SRW = 0.28)**

Within H4, the study indicates that the implementation of CRM success measurement impacts business performance. Thereby, it was found that organisations are not monitoring costs but the achieved improvements within their CRM practice or implementation. Parallel to H3, small and family owned organisations benefit more from a solid CRM success measurement while large and non-family-owned organisations cannot improve their BP.

**CRM Success measurement and aCRM Usage very strongly correlate (SRW = 0.92)**

The strongest correlations between the CRM constructs was identified between success measurement and the usage of aCRM. Hereby, it was discussed that organisations are measuring realised improvements of CRM and thereby further develop their analytical technologies. Looking at it the other way around, the usage of aCRM allows organisations to assess the success of CRM (i.e. to measure the success of their CRM activities).

**CRM Planning and Implementation and aCRM Usage very strongly correlate (SRW = 0.86)**

Focusing on the analytical part of CRM, the study revealed that a strong implementation supports the usage of aCRM. If organisations can plan and implement their CRM successfully
the usage of the software will be more successful as well. In addition, the ability to analyse the
CRM usage allows organisations to plan and implement further product developments.

**CRM Strategy and CRM Planning & Implementation very strongly correlate (SRW = 0.83)**

Another very strong correlation was identified between CRM Strategy and CRM Planning and
implementation. The study discussed, that organisations with a strong CRM strategy can plan
and implement better and more efficient, because they have strong management support.
Vice-versa, a strong implementation may affect the development of the CRM strategy.

**CRM Planning & Implementation and measurement very strongly correlate (SRW = 0.82)**

Lastly, it was identified that CRM Planning and Implementation requires a strong CRM
success measurement and the other way around. On one side, the study found that the success
measurement required a proper CRM planning. On the other side, the measurement of CRM
improvements supports the implementations as it drives change and enables CRM
practitioners to promote their implementation project.

### 8.3 Contributions of this study

Chapter one introduced the expected contributions of this study as summarised in table 1-2.
This section reviews these expected outcomes and contributions and thereby present the
achieved contributions of this study. Contributions can be discussed from different
perspectives tackling theory, methodology, empirical and practical contributions (Summers,
2019). In doing so, this section is divided into three parts. Section 8.3.1 elaborates the
contribution to knowledge, section 8.3.2 presents the methodological (and empirical)
contribution and section 8.3.3 discussed the practical contributions.

#### 8.3.1 Contribution to knowledge

This study contributes to knowledge, as it reviews, explains, tests and synthesises existing
literature and thereby creates new perspectives on CRM and BP. Specifically, it makes a
conceptual contribution to knowledge as it unifies literature from CRM and BP while
focusing on the German B2B sector (Summers, 2019). In specific, this applies to the
following main themes:
Definition of aCRM and historical review

A historical review of CRM literature has been conducted to understand how CRM as a concept emerged and how it has changed with the general availability of information technology. Thereby, relevant literature from the early 1990s until nowadays have been chronologically reviewed identifying trends and opinions about CRM in the corresponding time-period. Thereafter, a definition of aCRM has been worked out. To do so, three major perspectives on CRM have been reviewed and compared. The German B2B perspective focused on literature around German scholars from a rather practical sales and marketing perspective, the Anglo-Saxon perspective focused more on the academic and conceptual perspective of CRM and the software-perspective focused on the technical implementation of CRM. Combining these three views, a working definition for this study has been developed as foundation for the strategic CRM framework.

Development of strategic CRM framework

When discussing the strategic perspective of CRM many perspectives were reviewed. Different authors discuss CRM strategy from different standpoints, such as the customer buying process, channel management, customer value creation, technology or the overarching strategy in terms of linkage to the business strategy. These perspectives have been synthesised and enriched by customer requirements and the two output dimensions of external customer orientation and internal process efficiency. In doing so, this study provided a new and comprehensive CRM Strategy Framework (see section 2.4) which can be used as guidance when implementing CRM software or as basis for company-wide CRM initiatives. To do so, success factors for the implementation have been discussed next.

Discussion of success factors and their impact

If organisations implement CRM as a software, the literature provides comprehensive approaches, frameworks and findings. All these aspects have been reviewed and condensed into two major groups. First many aspects around technology and innovation must be considered when implementing CRM, such as data quality or the creation of an innovation culture. Second, organisational aspects (around processes, people and organisational structure) must be considered to successfully implement CRM. With this short summary, an
overview of key success factors has been provided by this study and can be used as checklist for practitioners when implementing CRM, especially within the German B2B industry.

**Overview of analytical technologies and applications for CRM including PA**

As this study focuses on the analytical part of CRM, the next major part of the contribution to knowledge covered the identification of aCRM technologies and applications. Therefore, the terminology around CRM, analytical CRM, data mining and predictive analytics has been clarified. This distinction can be used to ensure the same understanding within theory but also within practise. Afterwards two areas were further investigated. First, data mining was identified as major technological-approach within CRM. Hereby, an overview and explanation of data mining technologies has been provided (e.g. classification or clustering). Afterwards, main business applications within CRM have been introduced and linked to these technologies. Thereby, predictive analytics has been introduced from a technology perspective (i.e. what are PA technologies) and from an end-user perspective (i.e. what are possible applications for PA). Also, possible benefits have been assessed for each of the introduced PA application. In conclusion, this study has contributed to knowledge with a sound overview of aCRM technologies and applications (enriched with practical examples) supporting organisations in their analytical CRM challenges.

**Mapping of CRM functionalities and the CMAT model**

To conclude the CRM theory, the discussed CRM concepts (i.e. strategy, implementation and planning, measurement and analytical usage) have been compared to the CMAT model. Thereby, the study revealed that the CMAT model is not up-to-date in terms of modern (analytical) technologies and it does not consider the impact on business performance separately. However, it does cover some more CRM constructs explicitly (e.g. competitors). Overall, this study adds to the existing discussions around the CMAT model and critically reviews its concepts in comparison to other leading literature, which has been reviewed in this research. Next, these CRM concepts have been evaluated from a business performance standpoint.
Definition of BP within the CRM context

First, different dimensions of business performance have been reviewed within the literature aiming for a suitable definition of BP within the context of CRM. To do so, the terminology around profitability (i.e. financial performance), external customer satisfaction and internal process efficiency was discussed. Based on these three dimensions a definition of BP was established, including direct and indirect effects of CRM on BP and possible performance measurement tools (i.e. ROI and Scorecards). Hence, this study contributes with a CRM-specific definition of business performance.

Identification and assessment of direct and indirect effects of CRM on BP

Based on this definition, a detailed analysis was conducted to assess different effects from CRM on BP. Thereby, the study differentiated between direct and indirect effects. To do so, CRM benefits were identified, and the direct effects of these benefits have been mapped to the dimension of business performance so that this study is providing an impact indicator for all CRM benefits (e.g. increased customer knowledge). Next, the research has reviewed relevant indirect effects from CRM on BP. Thereby, the most relevant studies have been discussed briefly and relevant indirect effects were summarised. Hence, this study provides an overview of indirect effects which may be considered when evaluating the impact from CRM on BP. Afterwards, the study explored ROI and scorecard as possible measurement approaches.

Establishment of an ROI framework for CRM projects

To assess the success of an CRM implementation, this study came up with a possible calculation scheme to determine the success of a CRM implementation. To achieve this, aims and expected outcomes of CRM implementations were reviewed as well as related costs. These elements were aligned to the dimensions of business performance so that this study contributes a conceptual calculation scheme, which can be used to assess CRM success in the short-term.

Review of existing scorecard approaches and development of a CRM BSC

Besides the establishment of a short-term success measurement, this study also investigated existing studies for long-term measurements of business performance. To do so, several scorecard approaches and their measurement metrics were reviewed. Hereby, a strong focus
was set on the well-known balanced scorecard. After having reviewed the BSC this study concludes the contributions to knowledge with the development of an own balanced scorecard measurement for CRM and BP. Obtaining this CRM-BP specific scorecard existing dimension of the BSC have been adopted to the reviewed CRM and BP dimensions. Thus, this study provided an adopted BSC which can be further explored in theory and used in practice to assess the long-term success of CRM.

8.3.2 Contribution to methodology and empirical context

This study contributes to methodology, as it offers a new approach of measuring CRM and BP as individual constructs as well as providing different research models to evaluate the impact of CRM on BP. In addition, it contributes empirically by testing four main hypotheses based on the synthesis of existing literature between CRM and BP (Summers, 2019). In specific, the following contributions were achieved:

Development of a measurement model for CRM

A reliable and valid measurement model to assess the CRM implementation and usage was developed. This measurement model includes 17 measurement items, which cover five CRM dimensions namely CRM strategy, CRM planning and implementation, aCRM applications, aCRM technologies and CRM success. By using this measurement model, scholars can explore the usage of CRM for organisations further. Hereby, the measurement of the individual CRM dimensions can be evaluated (e.g. how did organisations plan and implement CRM) as well as the correlations between these dimensions. Hence, this study contributes empirically with an instrument that allows other researchers to make an evident statement about the CRM implementation and usage, also for other organisations (e.g. other industries or specific regions.).

Development of a measurement model for BP

A reliable and valid measurement model to assess BP was developed. This measurement model includes 10 measurement items, which cover three BP dimensions namely customer satisfaction, internal process efficiency and customer satisfaction. By using this measurement model, scholars can explore the assessment of BP for organisations further. Hereby, the measurement of the individual performance dimensions can be evaluated as well as the
correlations between these dimensions. Hence, this study contributes empirically with an instrument that allows other researchers to make an evident statement about BP measurement, also for other organisations (e.g. other industries or specific regions).

**Development of three research model to assess the impact of CRM on BP**

Based on these two measurement models, three different research models have been developed and tested assessing the impact of CRM on BP. The first research model includes only one CRM and one BP dimension and allows researchers to explore the relationship between CRM and BP assuming an uni-dimensional relationship. The second and third research models assume a multi-dimensional relationship between CRM and BP: Hence, one model includes four CRM dimensions, and another includes five CRM dimensions. Both models can be used to further explore the multi-dimensional relationship between CRM and BP. In conclusion, this study contributes empirically with three research models that allow researchers to further explore the relationship between CRM and BP.

**Hypotheses development to test CRMs impact on BP**

Next, a bundle of hypotheses has been developed to empirically test the impact between CRM and BP. Thereby H0 was formulated to test the relationship generally, whereas H1-H4 provide more insights on the specific CRM constructs. H3 is further detailed into two sub-hypotheses to distinct between the usage of aCRM applications and the availability of technologies. Thus, this study offers an empirical contribution due to the literature-based development of hypotheses, which can be re-tested (under other circumstances) from any other researcher.

**Quantitative evidence for hypotheses testing of CRMs impact on BP**

Lastly, this study also contributes empirically by providing quantitative evidence for the developed hypotheses. Thereby four out of six hypotheses can be supported as indicated in the table below.
Table 8-1: Empirical findings for tested hypotheses

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H0</strong>: Systematic CRM implementation positively affects BP</td>
<td>Supported (0.56)</td>
</tr>
<tr>
<td><strong>H1</strong>: CRM strategy has a positive impact on BP</td>
<td>Not supported (-0.02)</td>
</tr>
<tr>
<td><strong>H2</strong>: CRM planning and implementation has a positive impact on BP</td>
<td>Not supported (0.03)</td>
</tr>
<tr>
<td><strong>H3</strong>: Usage of aCRM technologies and adoption of business applications positively affect business performance</td>
<td>Supported (0.38)</td>
</tr>
<tr>
<td><strong>H3a</strong>: Usage of aCRM technologies positively affect business performance</td>
<td>Supported (0.20)</td>
</tr>
<tr>
<td><strong>H3b</strong>: High adoption of aCRM business applications positively affect business performance</td>
<td>Not supported (0.12)</td>
</tr>
<tr>
<td><strong>H4</strong>: The measurement of CRM success has a positive impact on business performance</td>
<td>Supported (0.28)</td>
</tr>
</tbody>
</table>

8.3.3 Contribution to practice

As this study aimed to achieve a practical impact, the German B2B industry was always a primary focus. Hence, the research contributes to practise for several reasons. First, the literature review was performed from the perspective of a B2B practitioner. In other words, the researcher has simplified the findings from other studies making it easy to understand and enable B2B organisations to apply the findings in the real-world. To do so, the study contributes to practice especially with the following frameworks, assessment and concepts, which can be used and adopted for company-specific needs:

- Strategic CRM framework
- Assessment of success factors for CRM implementation
- Assessment of aCRM technologies and applications
- Assessment of CRM benefits and their effects on BP
- CRM ROI calculation scheme
- CRM Balanced Scorecard framework

Second, the study exposes how organisations are implementing CRM and how they assess business performance. To achieve this, the study has identified which items are relevant for the specific concepts. For instance, German B2B organisations are assessing their CRM strategy
by incorporating customer groups and sales channels and they considered newest technology within their strategy. These statements have been made for all CRM and BP constructs and can be used by practitioners to challenge their own CRM practice or their business performance measurement. Moreover, this study offers the possibility for practitioners to measure their implemented CRM practices and evaluate the impact on BP based on the confirmed hypotheses. For instance, if an organisation has implemented aCRM technologies this organisation may evaluate the impact of these technologies on their specific business performance, based on the confirmation of H3. Therefore, they could use the CRM BSC or the CRM ROI calculation scheme and adopt it only on the analytical part of their CRM.

Third, the discussion of the findings provides practical interpretations of the empirical findings for each of the constructs, all correlations and the tested hypotheses. Again, any B2B organisation can use these statements as ‘checklist’ to challenge their own CRM practice. For instances, an organisation may review the statement ‘Clear requirement definitions help to plan, implement and measure the success of the CRM implementation’ and analyse their requirement definition process. Thus, this study offers 13 statements for the evaluation of BP and 20 statements for the evaluation of CRM. In this context, the research also explains the relationship between CRM and BP by providing 29 statements for the evaluation of the tested hypotheses (i.e. the relationship of CRM and BP – see appendix 16).

Fourthly, the study provided more detailed findings relevant to the organisational size and ownership. Therefore, the applied research models provide more specific insights for small and large as well as for family-owned and non-family-owned organisations. The generated results enable practitioners to classify their organisation into one of these groups. By doing so, all empirical contributions are more specific to the corresponding organisation. Moreover, practitioners can compare the results for their organisation with the results of others (e.g. larger organisations) and derive actions from it.

All of these four practical benefits have been conceptualised within an (online) business assessment and made available for +250k consultants within the network of the global KPMG membership firms. This online assessment helps consultants and customers to evaluate their CRM implementation and compare it with the impact on BP. To do so, three services are being offered within this business assessment.
1.) Online business analysis

The developed survey has been used to develop an online business analysis. This online business analysis is being offered in three stages as illustrated in the following figure.

**Figure 8—2: Overview of business analysis services**

<table>
<thead>
<tr>
<th></th>
<th>Free</th>
<th>Advanced</th>
<th>Tailored</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>1</td>
<td>Up to 20</td>
<td>unlimited</td>
</tr>
<tr>
<td>Duration / runtime</td>
<td>Ad hoc (until the browser will be closed)</td>
<td>1 year</td>
<td>unlimited</td>
</tr>
<tr>
<td>Results</td>
<td>Short summary</td>
<td>Result report in real time</td>
<td>Result report in real time</td>
</tr>
<tr>
<td>Price</td>
<td>free</td>
<td>100€ – 5,000€</td>
<td>Customer specific</td>
</tr>
<tr>
<td>Registration</td>
<td>Optional</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Additional services</td>
<td>none</td>
<td>Comparison with industry benchmarks</td>
<td>Customer specific consulting services</td>
</tr>
</tbody>
</table>

A limited test-version is offered for free, allowing consultants and customers worldwide to explore if this business analysis is suitable for their needs. If so, an advanced version can be offered to clients who would like to make a first assessment with key stakeholders within their organisation and compare it with industry specific benchmarks. Based on the advanced version, or alternatively a customer specific version of the analysis-tool can be offered. Hereby the survey serves as foundation but can be adopted to customer needs. This is specifically interesting for larger organisations or corporates, that like to assess their CRM across multiple entities. These business analytics empowers clients to understand the complexity of CRM, even if there are not experts, and start a first discussion within their management team.
Figure 8—3: Example of business analysis

Figure 8-3 gives an example of the business analysis illustrating the web-based browser version as well as the online version. After the business analysis has been completed, the next step is to analyse the data specifically and derive recommendations for action.

2.) Data analysis and recommendations for actions

With the gathered data, organisations are able to evaluate the specific CRM constructs based on the participants answers. Thereby they can compare themselves with industry benchmarks or within their own group (e.g. compare single subsidiaries, if they use different CRM approaches and systems). To achieve this, a data analysis report is provided and recommendations for actions are defined. The data results are simply reported and presented for each of the CRM constructs. The recommendations are normally presented from KPMG as consulting company incorporating the opinions of experienced industry consultants. For instance, if a technical implementation team implements the business analysis within a particular (niche) industry, they would incorporate an industry expert for the data analysis to derive specific actions. These results are presented and discussed afterwards within a customer workshop. Alternatively, organisations can also refrain from the recommendations and just receive the data analysis. In this case the organisation would derive company-specific recommendations for actions by themselves. In both cases, an implementation (i.e. CRM project definition and kick-off) will be the next logical step for organisations to perform.
3.) CRM project implementation

After having gathered and analysed the data, recommendations were discussed and approved, so that an organisation can decide to kick-off a CRM project. Hereby various projects are possible. In one case, it might be that an organisation has already an CRM system and wanted to improve the system and the corresponding CRM processes. Hence, the business analysis has identified possible weaknesses, which can be improved. For instances employees might think that they are not informed enough about CRM and therefore a new CRM communication strategy will be developed. Such a project would implement the recommendations for actions and organisations benefit from a data-driven approach to identify, implement and follow-up (i.e. re-do the analysis after some time) improvements. In another case it might be, that the organisation aims to implement a CRM system and therefore uses the business analysis to focus on specific parts of it. Hereby, the business analysis has two main benefits. It can be used to identify company-specific issues which must be managed with caution during the CRM implementation (e.g. Customer channels are not incorporated into CRM so far). Moreover, it can be used to perform a pre-post comparison by executing the survey before the CRM implementation and afterwards and thereby evaluate if it has an impact on the participants perception. Hereby, and by making use of the business analysis tool as well as the three presented services, organisations can achieve the following benefits.

- Standardised assessment of the actual CRM practice allows a data-driven discussion about the importance and success of CRM;
- Comparison of the own perception of CRM with other industries helps to identify weaknesses and recommendations for actions;
- Development of a customer-specific assessment empowers organisations to evaluate and compare CRM within their organisation (e.g. across countries);
- Using the business analysis tool within an implementation project helps to identify customer specifics which must be managed with caution;
- Using the analysis tool prior to an implementation project allows to perform a pre-post comparison and thereby assesses the success of the implementation.

In conclusion, the business analysis and the three presented services support organisations to drive and improve their CRM practice.
8.4 Managerial implications

Based on the presented contributions, especially to practice, this section will discuss the managerial implications which can be drawn from this study. Hereby it is key to differentiate, that the practical contributions are achieved results, while the managerial implications are interpretations based on the background of this study in chapter one (in specific the presented macro- and micro-perspective illustrated in table 1-1). Simultaneous to chapter one, this section discusses managerial implications from a macro- and micro-perspective.

Starting with the macro-perspective the most relevant managerial implications are being discussed based on the findings of this study. First and most importantly, the impact of new IT technologies (i.e. analytical CRM technologies) on business performance has been confirmed by this study. Consequently, organisations of all sizes must focus on technological aspects when it comes to Customer Relationship Management, especially in the analytical area. As job profiles such as data scientists become increasingly important and demanded by organisations it is not surprisingly that companies must invest into technologies but also into people. However, the integration of technology and people are equally important. Therefore, this study has also shown that simple technologies such as data visualisation and forecasting have the highest impact on the implementation of aCRM. Thus, organisations need to start simple and invest into ‘quick wins’ so that technologies do not remain a technical invention but evolves quickly to practical application.

When talking about applications, the study found that applications in the field of customer service are mostly important (e.g. analysing customer loyalty and reasons for complaints). This confirms, that customer service is already the major area to develop (and improve) customer relationships. Customer service has also a very high impact on the performance in terms of customer satisfaction. Customer satisfaction is driven by the measurement of loyal customers, positive customer ratings and referrals. Consequently, organisations must focus on customer service even more in the future because products are becoming less important, but the management of customer experience became the key differentiator for any organisations. Especially in a globalised competition, this differentiator becomes key to survive as most of the products can be substituted. To do so, the study confirmed that customer referrals and customer ratings are key for customer satisfaction while internal measures such as customer
response time are less important. This also confirms, that customers are better informed than ever and therefore organisations must focus on designing their customer experiences at the best, if they want to win against their global competition. In addition, organisations should focus much more on customer feedback and strategically develop their CRM practice. The study found that customer feedback is not incorporated, and that CRM is not embedded into the overall business strategy, which both implies that German B2B organisation must improve in these aspects.

Finally, the German B2B market must be slightly differentiated. CRM seems to be less impactful on the business performance for larg(er) organisations than for small(er) organisations. Thereby, large organisations seem to have an advantage in the marketplace due to their strong history, which explains the weaker impact from CRM an BP. On the other side, small(er) organisations do directly benefit from CRM practices. Hence, it is important – from an organisational perspective – to assess the own performance precisely against relevant competitors and make strategic investments ideally in the customer service areas of CRM.

Considering managerial implications from a micro-economic perspective, some more assumptions can be discussed. First, it was found, that the business perspective must be leading when it comes to CRM initiatives and software implementations. To achieve the macro-economic customer centricity, organisations are forced to design a business-orientated CRM strategy. IT departments and their technologies are important, but they should not be decisive when it comes to the strategic positioning of CRM within the organisations. Hereby, marketing departments seem suitable for this role as they own traditional CRM responsibilities within an organisation. At the same time, they must incorporate sales and especially customer service, because customer service remains the distinctive CRM area to achieve competitive advantage.

Second, the study confirmed the high importance of an excellent implementation practice for CRM software. Hence, organisations must focus on their abilities to deliver CRM functionalities, otherwise the definition of a CRM Strategy will have very limited impact on the organisation’s performance. Within a strong implementation practice, roles and responsibilities must be clearly assigned even if small(er) organisations are operating with shared roles (e.g. combination of change and communication programme). With that said, the
initial assumption of many failing CRM implementations can be confirmed, and this study suggests focusing on a solid implementation practice.

Looking at the analytical part of CRM, it can be confirmed that organisations are operating on many manual and decentralised analyses, because the availability of aCRM technology was found to be more impactful on BP than the actual applications. With that said, organisations should invest into centralised analytical departments who operate as internal service provider. Thereby, organisations will benefit from a central overview of all available analyses as well as from a central department that owns all data within the organisation. This can be considered as first step for German B2B organisations towards a data driven organisation.

Lastly, the isolated management of many CRM activities in marketing, sales and service must be pro-actively challenged by organisations. Without aligning these activities and exchanging customer information, every organisation will struggle to provide excellent customer service and built up long-term customer relationships. To do so, it can be implied that organisations should focus on the development of a central CRM team or department. Some organisations are implementing such teams already and focus them on process-related tasks striving for process excellence. While the management of business processes is a key challenge, it focuses mainly on internal activities. Hence, organisations should re-think the tasks and responsibilities of such teams and may built up a Customer-excellence team which acts as strategic counterpart for marketing, sales and service. In that context, organisations would organisationally develop a central unit to develop CRM functionalities (also technologically with the IT department), support the development of a data-driven organisation and finally aims to increase business performance. Finally, table 8-2 summarises the macro- and micro-economical managerial implications.
Table 8-2: Macro- and micro-economical managerial implications

<table>
<thead>
<tr>
<th>Macro-economic managerial implications</th>
<th>Micro-economic managerial implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology heavily impacts organisations and they must invest in people, IT and the organisational integration</td>
<td>A CRM strategy should be owned and driven by business-departments (e.g. marketing) and not by IT department.</td>
</tr>
<tr>
<td>Customer service is already the key differentiator for organisations and impacts the customer relationship most.</td>
<td>Organisations must focus on a strong CRM implementation to deliver CRM functionalities which help to achieve their strategic targets.</td>
</tr>
<tr>
<td>The German B2B industry must re-structure their organisation from product orientation to customer (experience) – orientation.</td>
<td>To become a data-driven organisation, companies should invest in centralised analytical departments, also for CRM.</td>
</tr>
<tr>
<td>Highly informed customers and global competition force organisations to focus on customer experience instead of internal processes.</td>
<td>German B2B companies should re-think their organisational structure and align sales, marketing and customer service closer together.</td>
</tr>
<tr>
<td>Large organisations still benefit from historical success while small organisations benefit more from CRM → Strategic investments of CRM</td>
<td>To become more customer-centric, organisations may establish organisational unit(s) that are responsible for the CRM strategy and implementation as well as for the data and its analysis.</td>
</tr>
</tbody>
</table>

8.5 Limitations and future research

As research in the business environment is a multi-causal challenge, this study has its limitations which will be discussed in this section first. Based on the limitations, possibilities for future research are presented.

The first limitation is related to data quality. Even though 500 responses ensure statistical relevance for the targeted population, the participants can be qualified further. All data was gathered from an online-panel whereby the participants have been incentivised. Hence, it can be further tested, whether a participant only answered promptly to receive the incentive. The study has worked with exclusion questions to ensure that only qualified participants will be considered nevertheless, these answers have not been tested with a confirmation question at the end of the survey. Due to the fact, that a single-source was used for the data gathering, common-method bias might be a further limitation. This was tested and the participants have not been introduced specifically into the aims of the study and were asked to answer the questions regarding CRM and BP within two sections of the questionnaire. Hence, scholars can refine the data gathering process using existing frameworks for digital research such as
the 3Es from Sarah Quinton (2013) by challenging ethics, expectations and expertise of the respondents their answers.

Another limitation can be seen in the examination of CRM and BP with its constructs (i.e. measurement items). The identified constructs are based on the literature review, however other measurement items might be relevant as well. Some constructs were assessed with only three measurement items and the R² of the research model was reported with ‘only’ 0.33. By extending the measurement items and ensure statistical reliability and validity at the same time, the model might be able to explain more variance due to a better assessment of the CRM and BP constructs. Also, it may be argued that especially the BP items are not measurable, because the participants were asked to compare their performance with the closest competitors. Thereby a strong subjective examination of every single participant is required about the performance of their own organisation as well as about their competitors. To overcome this, future research should focus further develop the definition of CRM and its constructs as well as on the assessment of BP. For CRM, new measurement scales might be developed and tested with larger sample sizes to ensure that they measure CRM adequately. For BP, secondary data might be added to the existing (or further developed) measurement scale which gives an independent and comparable measurement for the provided answers from the participants.

Looking at the discussed findings and the interpretation of the results, another limitation may be mentioned. Comparing the interpretations of this study with other studies, the focus on the German B2B sector could not be guaranteed. In other words, these findings were compared with studies that are focusing on other industries or sectors. Consequently, further research can be made in combining different research frameworks and apply them for a specific industry or sector. Thereby, different measurement instruments may be used to assess CRM and the findings can be discussed based on the same data base. For instances, one might use the developed measuring instrument from this study as well as the CMAT framework an applies it for the German automotive industry, which is a major industry within the sector. By doing so, the results can be specified for this industry and two approaches for measuring CRM are being tested against each other.
In addition, this study is only based on quantitative data. Hence, the results were interpreted based on the researcher’s knowledge and available literature. However, a limitation can be found in the missing qualitative exploration. None of the participants had the possibility to explain their answers or to ask clarifying questions. Future research might explore the quantitative findings from this study with qualitative interviews and ask experienced practitioners from the B2B sector, leading CRM researchers and the original participants for their explanation. Based on their opinions and the generated results, the discussed interpretations (especially the key statements and the practical framework) can be enhanced or – in parts – even revised.

Also, the answers are based on the beliefs and information of the participants as the questionnaire measures were self-reported. Hence a limitation can be identified in the measurement methodology, because the answers were not tested or re-confirmed with other sources (e.g. secondary data). Hereby, the cross-sectional method of the survey also plays a major role. All data was gathered at one specific time, which implies that the answers may have been given differently, if the participant would have been asked at another time. A longitudinal study could overcome this limitation by asking the participants a second or third time and thereby improves the data quality. Consequently, further research should focus on the time-perspective gathering data over a longer period.

In conclusion, the research offers many possibilities for further research and at the same time the generated results and interpreted findings are statistically relevant and therefore contribute to the body of knowledge within the CRM literature and offer practitioners frameworks to improve their understanding of CRM and its impact on BP.
8.6 Summary

This chapter offers conclusions and summarises the overall research project. Based on the findings of this research, the study answered the main RQ on how large German B2B organisations implement and use CRM and what are the effects on BP. In achieving this, the research identified the main CRM constructs (namely CRM strategy, implementation & planning, usage of aCRM and CRM success measurement) for this study and offered a measurement scale for each of the constructs to assess how organisations are using CRM. Moreover, the impact of these constructs on business performance was evaluated. Also, a research instrument was developed to empirically investigate the relationship between CRM and BP.

Herewith, CRM has been identified as an important factor for business performance of German B2B organisations. It was identified, that the usage of analytical CRM and the success measurement of CRM implementations have a direct and significant impact on BP. Besides the direct impact, the importance of CRM planning and implementation as well as the significance of a well-defined CRM strategy was discussed. All these constructs correlate to each other, but very strong correlations were found between CRM strategy and planning & implementation, between CRM planning & implementation and success measurement, between CRM planning & implementation and the usage of aCRM as well as between CRM success measurement and the usage of aCRM. After interpreting the quantitative findings of this study, contributions were discussed, and several managerial implications have been introduced. Finally, limitations were addressed and opportunities for further research have been illustrated.

Aiming for an outcome that is relevant for theory and practice, this study provides three main results for academia as well as for practitioners. First, theoretical CRM models were combined and synthesised to new frameworks and assessments. Hereby, new theoretical perspectives have been provided and the frameworks can be used by practitioners managing CRM. Second, the research model empirically investigated CRM and BP and assessed the impact for the German B2B companies. Third, the generated results were discussed from a B2B perspective so that future research can be conducted and that practitioners can improve their decision making. Ultimately, CRM has been confirmed as one of the core information technologies on how organisations make business and remains a thrilling area for further research.
# 9. Appendences

## Appendix 1: Literature review tables of key articles

### Definition of CRM

<table>
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<tr>
<th>State of the art in relevant literature</th>
<th>Key articles from main authors</th>
<th>Key findings / arguments</th>
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<td>Defining CRM is key to set the boundaries of the research, because CRM as overall concept is very broad. There is a strong agreement in the literature that CRM involves operational, analytical and collaborative elements and some authors add strategic CRM as an additional element. Looking at the targets of CRM authors acknowledge a lot of internal improvements, but they lack in focusing on the external targets of any CRM approach. Besides the strategies and elements of CRM, information technology is a key aspect of any article since CRM is highly driven by modern software. Studies suggest that IT capabilities are important to implement a CRM strategy and to finally derive value from the operational, collaborative and analytical elements of CRM.</td>
<td>(Gummesson &amp; Gummesson, 2004)</td>
<td>CRM can be defined as values and strategies of relationship marketing which should be converted into practical applications</td>
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<td>(Payne &amp; Frow, 2005)</td>
<td>CRM is defined as cross-functional integration of strategies, processes and IT systems. Moreover, the perspective of external shareholders is incorporated whereby value creation for the customers plays a major role. Strategy achievement can be monitored with modern IT capabilities by measuring the integrated channel management.</td>
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<td>(Iriana &amp; Buttle, 2006)</td>
<td>Differentiation into three categories. First, operational CRM comprises the business processes and its daily operations. Second, collaborative CRM comprises the processes where organisations collaborate with their customers. Third, analytical CRM enables organisations to analyse customer data and identify patterns to improve decision making.</td>
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<td></td>
<td>(Jafari Navimipour &amp; Soltani, 2016; Soltani &amp; Navimipour, 2016)</td>
<td>CRM helps organisations to merge and manage customer interactions and to keep track of all customer information</td>
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<td>(Landry et al., 2005)</td>
<td>The definition of CRM is three-folded. First, it is a term for IT and e-commerce that is used to manage customer relationships. Second, it can be described as set of mechanisms within an organisation to react and predict changes in the market. Third, it is about the usage of modern information technology to capture and track customer needs.</td>
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<td></td>
<td>(Kong et al., 2010)</td>
<td>Analytical CRM can be defined as the intermediate software piece between the operational CRM and the BI / data warehouse software. From an analysis technique perspective, it can be explained as attempt to analyse customer interactions and the improvement of further interaction between them and the organisation. Lastly it supports management decisions with profound data.</td>
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CRM can be separated into three levels. Strategically it focuses on the development of a customer centric business culture. Analytically it collects and makes sense of different data which is available within the organisation to answer questions like "who are the most valuable customers"? Collaboratively it supports departments and members of the organisation to share information.

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<td>Based on the different definitions, various perspectives of CRM do exist in the literature. Firstly, some authors differentiate between conceptual perspectives of CRM and the technology perspective. Discussions about concepts of CRM describe it as companywide strategy and initiative that includes value creation, channel management, IT systems and performance measurement targeting higher customer satisfaction and lower operational costs. Complementary to this rather strategic view, process views do exist whereby CRM is described as a subsequence of activities to manage customer relationship and/or to</td>
<td>(Iriana &amp; Buttle, 2006)</td>
<td>Three major perspectives of CRM are widely known in the literature. These perspectives are strategical, operational and analytical CRM. All three are relevant for organisations that implement and use CRM. However, it is important to know which of the perspectives might be of leading interest for the institution. This can be measures with different scale items, where a model was developed by Iriana and Buttle (2006) which allows organisations to measure an organization’s orientation towards these three types of CRM. However, slight variations do exist such as</td>
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<td>(Payne &amp; Frow, 2005)</td>
<td>CRM can be described in a conceptual framework of five elements. First, the strategy development processes define a business strategy and based on this a customer strategy is derived. Within those strategies two correlating value creation processes are designed. On the one side the value creation for customers and on the other side the received value of the organisation. Realising these value creations multiple sales and advertisement channels (e.g. telephony, direct marketing or mobile commerce) must be managed holistically. To do so an information management process conjunct the value creation process with the integrated channel management and with an organisation wide performance assessment process. This Information management process is used as controlling mechanism for the defined strategies. Therefore, shareholder results and performance monitoring are the key elements which are fed by operational outcomes from the integrated channel management. All these processes must be considered when defining a CRM strategy as basis for a software implementation of for any other CRM initiative.</td>
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implement the corresponding CRM system. As discussed within the definition of CRM different views exists (operational, analytical and collaborative). Complementary, some authors incorporate strategic elements or other terminologies such as a B2B web platform.

Well-established concepts discuss the separation of analytical, collaborative and operative CRM as well as the availability of CRM as ’eCRM’. However, recent articles introduce new concepts to the literature, such as social or mobile CRM. Finally, some first concepts exist specifically for analytical CRM describing how to set up a CRM system from an analysis perspective. However, those contributions are rare and have a limited scope as they discuss single case studies.

**Characteristics of CRM and B2B (here: the electronic interaction of businesses via web) can be compared and some similarities are identified (e.g. customer research is needed). However, also differences of both modules are existing (e.g. CRM is originally focused on B2C). Comparing those characteristics two integration strategies are described. The first approach describes how CRM can be embedded and adjusted to meet the B2B needs. As a result, the integration strategy requires more effort - which means more costs - but at the same time the CRM is tailored for B2B needs and organisations will serve customers better. The second approach describes an integrated architecture where the B2B interaction web platform is merged with an CRM system. Even though this can be realised quicker and with less effort, the advantages are limited as well.**

**A model for CRM can also be described as subsequence of different activities to improve the relationship to customers with the implementation of a CRM software. Hereby, the creation of a customer database is a possible first step where different data such as transactional data, contacts or descriptive information should be stores. The comparison of interaction frequency and customers interaction (direct or indirect) can be used to evaluate the standpoint of an organisation prior to the creation of a database. As soon as a database is created, data must be analysed. With the result of the analysed data a customer selection can be performed so that the right customers are being targeted. To do so, an appropriate and efficient relationship program should define the customer service activities, suitable loyalty programmes or rewards, possible customisations and even the establishment of certain communities (e.g. developer community for software products). Finally, privacy issues must be considered when setting up the system and key metrics should be implemented to monitor the performance of the system itself, of the user acceptance and of the actual impact on the end customers.**

**CRM can be defined within four stages. In stage one customers are being identified with the help on analysis. Stage two attracts customers with marketing activities and tries to keep customer retention high (stage 3). Lastly, stage four tries to develop customers with initiatives to realise cross- and up-selling.**

**E-CRM as new concept/Technology of CRM is introduced with many advantages such as the differentiated customer care based on their needs or gaining new insights through different (electronical/online) sources. Moreover, customers are increasingly important as co-designer / producer of products and users of E-CRM can reduce interfaces because of the general availability of the system. Overall E-CRM allows organisations to increase their time for customer care and therefore improves customer satisfaction.**
Based on the main implementation reasons, twenty CRM systems are analysed to identify the extend of analytical functionalities in the system with the results, that all systems offer operational functionalities but only 40% analytical functionalities. Consequently, the potential of customer knowledge is not fully exploited. Improving this, an analytical CRM should differentiate between internal and external information on the one side and on the other side answer the question who relevant customers are and how they behave. Technically, profiling helps identifying the customers (i.e. into profitability and costs) while pattern analysis (i.e. purchase, contact, retention or response behaviour) helps to analyse how they behave. Logically, target customer groups must be defined first before analysing their behaviour patterns. Enhanced analytical CRM increases customer knowledge, which helps organisations to predict future behaviours and supports strategic management decision from a strategically and operational perspective.

(Kong et al., 2010) Proposal of a model for analytic CRM, and illustration of its application in customer grouping and corresponding strategy.

### Relevant factors for CRM implementation and adaptation

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<th>State of the art in relevant literature</th>
<th>Key articles from main authors</th>
<th>Key findings / arguments</th>
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<td>The literature discusses the following key perspectives which are relevant for the implementation and adaption for CRM.</td>
<td>(Alshawi et al., 2011)</td>
<td>CRM Adaptation factors of MSEs are similar to large corporate firms regarding technical organisational and data source factors. This includes many adoption factors in the area of organisational and technical aspects of CRM adaptation as well as factors determine data quality.</td>
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<td>(1) From a technical and innovation perspective data warehouses, enterprise resource planning (ERP) systems, and the general availability of the Internet with its increasing bandwidths are widely discussed. Moreover, data quality has a strong impact on the implementation/adaptation. Most authors agree, that a well-established technology orientation makes it much easier for organisation to generate benefits out of a CRM system because its adaptation can be realised faster. A few authors highlight that, innovation factors must be considered because they influence the positive attitude towards the usage of CRM.</td>
<td>(Chen &amp; Popovich, 2003)</td>
<td>Understanding CRM with regards to technology, process, and people. The success of CRM implementation is dependent on those factors as combination. Many implementations fail because organisations miss to consider CRM a cross-functional and holistic approach that needs an adjustment of the business processes in the organisation. As a result, and with the support of improved information technology CRM will help organisations improving relationships and profitability.</td>
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<td>(2) From a process perspective the literature suggests that organisations must shift from standard product transactions to customer centric organisation. Therefore, CRM technology is key, and its implementation helps to focus on end customers, reduce administration tasks,</td>
<td>(Sebian et al., 2016)</td>
<td>All process, technology and innovation factors of an organization have a positive impact on the attitudes towards using the tools of aCRM.</td>
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foster customer loyalty and measure customer centric KPIs. In addition, studies highlight the general process orientation of an organisation that support the implementation and usage of CRM systems. Other authors focus on the people perspective where effective training, change management and management support are introduced as main factors.

Quantitative studies provide evidence, that for most of the factors the influence is similar between MSEs and larger cooperation's.

### Measurement of CRM Success / Return on Investment

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<th>State of the art in relevant literature</th>
<th>Key articles from main authors</th>
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<td>The literature of success / ROI measurements of CRM is extensive. Considering a few selected articles with high relevance it can be summarised that the success of CRM is dependent on many factors, which are discussed below. From a quantitative ROI perspective key concepts exists but differ in the depth of detail and in the general approach; i.e. combining several indicators or measuring them individually. The literature agrees that the measurement of external customer centricity and of internal process efficiency are key pillars for the ROI measurement. Some differentiate this as financial and market aspects while others describe the return of</td>
<td>(Winer, 2001)</td>
<td>The success of CRM can be measured in two ways. First, with financial and market measures such as market share, profit margins, etc. Second, with customer centric measures, such as acquisition costs, conversion rates, etc.</td>
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<td>(Anton &amp; Petouhoff, 2001)</td>
<td>ROI of CRM projects are determined by two key elements. First, the cost of training on personnel and customers are key to the success of the whole implementation. Second, the data to measure the actual ROI should be derived from customer contact centres so that the actual ROI calculation is as close as possible to the market.</td>
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<td>(Bohling et al., 2006)</td>
<td>Measuring the effectiveness of CRM implementations, the survey found five key elements which are important to determine the ROI. 1. Creating a quantifiable business case, which can be used to measure the ROI precisely. 2. Develop corresponding metrics and track the individual KPIs of the above-mentioned business cases 3. Don’t focus on short-term benefits only, but also incorporate the long-term targets of the CRM initiative and thereby keep the balance during and after the implementation 4. Compare benefits and costs after the implementation (and compare them with the assumptions prior to the rollout) 5. Approach the implementation in steps and thereby deliver value after each phase which can be (if appropriate) measured</td>
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the relationship itself incorporating external metrics (e.g., network effects or customer value) and internal metrics (e.g., profitability or customer lifetime value). Moreover, the actual methodology of ROI measurement is discussed partly.

(Gummesson & Gumnesson, 2004)

Return of Relationship is being discussed as new paradigm of measuring the success of CRM. Instead of looking for single ROIs per transaction it is suggested to measure the long-term relationships. Therefore, three approaches are introduced. First the triangle between quality, productivity and profitability of the relationship which basically indicates that higher quality (meaning better relationship management such as processing time down) can reduce costs and therefore increases profitability. Second the customer lifetime value concept discusses shortly the approach of measuring value as a combination of value perception (combination of price and function), brand perception and repeated purchases of a customer to determine the long-term relationship value of CRM. Thirdly, the network aspect of CRM highlights the importance of profits and losses across multiple relationship layers. In other words, if one customer is happy with the offerings of a specific brand, he will share this within his network and other will know about it.

**Data Mining as major part of aCRM**

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<td>Within the analytical part of CRM, quite a few applications are being discussed in the available literature, whereby Data mining as technology is one of the topics that is discussed the most. Consequently, authors introduce it in either a technical way for implementation purpose or in a conceptional way for managerial consideration. From a business perspective, authors tend to explain it within the applicable CRM stage such as customer identification. All articles support the argument that organisations are capable to improve customer satisfaction and increase profitability with data mining. Overall authors have different approaches in either introducing data mining as generic framework (conceptual or technical) or they target specific applications with a detailed calculation.</td>
<td>(Qiaohongi et al., 2007)</td>
<td>Data mining is the key technology of analytical CRM. Therefore, a framework is provided which indicates the preconditions for data mining applications. The model is based on the business applications which were identified before.</td>
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<td>(Ngai et al., 2009)</td>
<td>Application of data mining techniques: The CRM environment can be classified in 4 stages, which are customer identification, attraction, retention and development. Within those stages different applications can be applied using different data mining functionalities, such as clustering, forecasting, regression, sequence discovery, visualisation, association and classification. Within the customer identification target customer analysis and customer segmentation are identified while in the customer attraction stage direct marketing applications are mainly focused. Within the customer retention phase loyalty programs, one-to-one marketing and complaint management can be supported by data mining functionalities. Finally, customer lifetime value calculations, up and cross selling as well as market basket analyses are potential data mining functionalities in the customer development stage. For each of the data mining functions several techniques do exist. The key techniques discussed in the literature are neural networks, decision trees, association rules and regressions.</td>
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<td>(Jafari Navimipour &amp; Soltani, 2016; Soltani &amp; Navimipour, 2016)</td>
<td>With the support of data mining CRM can improve customer satisfaction and enhance the profitability of the market and finally achieve competitive advantages. Organisations can achieve this because data mining within CRM allows them to predict customer behaviour, improve customer services, build up a CRM system based on strong and interpreted data and finally to develop and execute marketing and sales strategies.</td>
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Development of a framework that includes data mining and knowledge management into aCRM. Thereby gathered customer data will be processed within a data warehouse and with data mining technologies. The finding of those analyses will be constantly synchronised to the CRM system so that information can be used steadily, and additional data can be faded for further analysis. Hence, the knowledge management and the aCRM application can be enhanced using data mining which leads to higher bottom line results due to the distributed knowledge from aCRM into the organisation and due to added value to the customer.

Specific aCRM applications

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<td>With data mining as key technology of aCRM some applications are discussed in detail. Most of those applications are rather specific and authors tend to be more technically and explain the statistical calculations behind the results. Simultaneously a few conceptional approaches were identified as well. The key applications that were identified are the following: - Churn prediction using vector machine and Naïve Bayes Tree - real-time analytics using in-memory analytics - Customer prediction (age &amp; gender) using K-mean and genetic algorithm - Customer selection and success measurement of CRM programs using decision trees. All these applications aim to improve the knowledge about customers and their data or behaviour. These insights are being used to either target the customers specifically with advertisement or to adjust the communication activities specifically to their needs or to the organisations marketing &amp; sales strategy.</td>
<td>(Farquad et al., 2014)</td>
<td>Churn prediction using comprehensible support vector machine. Support vector machine classifies elements in two or more groups. Hereby the classification is enhanced by machine learning with the result that the two groups are separated with a minimum of elements being classified close to the other group (i.e. both groups are clearly separated with little 'intermediates'). Support vector machine was combined with Naïve Bayes Tree (NBTree) to solve the problem of churn predictions sensitivity at large unbalanced data sets. Consequently, the study solves an issue within a common aCRM application (churn prediction).</td>
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<td>(Acker et al., 2011)</td>
<td>Introduction of real-time analytics which unifies operational and analytical CRM in one application and hence allows organisations to perform analytics on the fly. As a result, performance increases, customer value creation improves, and costs are being lowered. Drivers for real-time analytics are discussed whereby from a business perspective speed of requested analytics to accelerate the decision making is demanded across industries. Technically the huge amount of data drives real-time analytic applications and thanks to improved technologies deployments can be shorten and greater insights from the analytics result in more knowledge about customers and markets which increases efficiency i.e. through self-services.</td>
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<td>(Rathi et al., 2010)</td>
<td>Development of a model which can predict the trend of customers buying a computer based on age and gender. Therefore, a database was set up and analysed with the help of algorithms. Afterwards customers can be selected and approached before building a relationship with those selected customers. Those formulas were described in detail from a technical perspective.</td>
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<td>(Florez-Lopez &amp; Ramon-Jeronimo, 2009)</td>
<td>With the help of machine learning technologies and decision trees a 3-stage methodology for CRM management is introduced. It includes customer preferred feature selection, several segmentation techniques (i.e. decision trees) and a global cost–benefit function for measuring the success of a CRM program (i.e. mailing).</td>
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Customer knowledge management and analytical CRM are introduced and discussed. Based on the fusion of data, customer knowledge should be increased for better decision making and thereby increase the efficiency and effectiveness of implemented CRM systems.

### Specific applications and models of Predictive Analytics

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<td>Several applications of PA are introduced in recent articles. However, those articles are not always related to CRM technology but mostly to the actual customer management. Most authors present applications from a rather technical perspective while some authors are presenting them on a very high level trying to explain it easily for practitioners. Most applications are discussed in the following areas: - focusing on customer retention and measures to reduce customer churn rates</td>
<td>(Mishra &amp; Silakari, 2012)</td>
<td>The authors summarise the key essence of predictive analytics. Thereby it is stated that PA is the future of data mining and therefore data mining must be understood as data science and therefore needs a lot of expertise. After a short introduction of data mining predictive analytic techniques are introduced and the single steps of predictive models are explained. Moreover, the needed modelling processes are shortly explained before discussing possible applications. Lastly, the authors illustrate opportunities and challenges of PA.</td>
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<td>(Davenport, 2013)</td>
<td>Several applications of PA are introduced in recent articles. However, those articles are not always related to CRM technology but mostly to the actual customer management. Most authors present applications from a rather technical perspective while some authors are presenting them on a very high level trying to explain it easily for practitioners. Most applications that are discussed are (1) focusing on customer retention and measures to reduce customer churn rates and (2) analyse customers and markets to identify patterns which can be used for targeted communication and marketing activities. B2B is clearly focuses from most academics and some articles narrow down to a specific industry case study (e.g. retailing).</td>
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<td>Reference</td>
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<td>(Chen et al., 2012) Chen and Storey, 2012</td>
<td>An overview is provided which illustrates the evolution, applications and emerging research topics of Business Intelligence and Analytics (BI&amp;A). From an evolution perspective the authors state, that BI&amp;A 1.0 is not of great relevance anymore as most of the organisations do not apply database management system for structured data. More considerable is today’s area of web based unstructured content (BI&amp;A 2.0) that must be analysed as well as the upcoming urgency to incorporate mobile and sensor-based content (BI&amp;A 3.0). From an application standpoint many different areas are discussed. Thereby the data structure, the analysis techniques and the impact for the application is elaborated. The discussion incorporates applications in e-commerce and marketing intelligence, e-government and politics 2.0, science and technology, smart health and wellbeing as well as security and public safety. Lastly, the technical analysis methods (Big Data-, Text-, Web-, Network-, Mobile Analytics) are observed from two perspectives. First, the technological foundation is introduced and allocated to the individual analytical technique. Second, the emerging research is considered as well. In summary, the authors find that organisations are trying to incorporate the trend of mobile data into their analytical strategies while they are still at a stage where web-based content must be combined with traditional database analysis. Therefore, the improving analytical technologies must be considered. By highlighting possible applications and relevant research the authors finally contribute to the discussion of analytics in research as well.</td>
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<td>(Mirzaei &amp; Iyer, 2014)</td>
<td>The authors review existing literature about applications of PA in the CRM context. Thereby CRM is defined in five stages, which are customer acquisition, customer attraction, customer retention, customer development and customer equity growth. Most attention is spent on the customer retention stage, where organisations try to foresee the churn rate. Besides that, customer lifetime value is a relevant topic where PA tries to predict the CLV. No great attention was spent on the other areas of CRM. From a PA technique perspective logistic regression, decision trees, and segmentations are the most relevant calculations which are discussed in the literature. Lastly, information technology is mentioned mostly as key element of PA and some tools are presented which help to illustrate the results of PA within CRM.</td>
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<td>(Bradlow et al., 2017)</td>
<td>The authors discuss the role of big data and PA specifically in retailing whereby they kick-off with a classification of data dimensions according to customers, time, channels, products and location. Following that the sources of data gathering are illustrated in a three-folded model. Originally relevant data comes from sales and inventory statistics which are generated by the ERP systems. These data sets are enriched by customer household data which is derived from loyalty cards or social demographical profiles. Lastly, the location data becomes increasingly important whereby insights are extracted from mobile apps, environmental data such as weather or relatively product locations. After discussing the statistical issues of big data in retailing, which are data compression and Bayesian inference, a PA model is developed which evaluates if the price optimisation (suggested by the model) increases the profitability of the affected retailing store. The findings of this field-experiment provide evidence, that the PA model for price optimisation increases gross-margin profitability.</td>
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Overall, B2B is clearly focused from most academics and some articles narrow down to a specific industry case study (e.g. retailing).

| (Bohanec et al., 2016) | Machine learning predicts are explained with a model for B2B sales predictions. Therefore, B2B experts generate data sets which are used as input for predictive models such as classification trees or regressions. Based on those predictions an explanation is generated using the EXPLAIN and IME methodology which basically observes how the output changes when the hidden input factors are being changed. If the output factor changes dramatically the input factors seem to be relevant for the model. Those newly generated outputs result in new insights which are being used to improve the original data set of the PA model. By using this model for a specific business scenario (weak sales performance in one segment) the authors prove that sales predictions can be an effective support for B2B sales due to better internal knowledge and communication of the team. To do so the authors suggest identifying the most relevant attributes of data to select the best-performing machine learning model and use the explanations to generate insights. |
| (Rathi et al., 2010) | Development of a model which can predict the trend of customers buying a computer based on age and gender. Therefore, a database was set up and analysed with the help of algorithms. Afterwards customers can be selected and approached before building a relationship with those selected customers. Those formulas were described in detail from a technical perspective. |
# Key technologies to apply Predictive Analytics

<table>
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<tr>
<th>State of the art in relevant literature</th>
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<th>Key findings / arguments</th>
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<td>Looking at the literature from a technology perspective, many technologies are introduced and most of them are explained technically. Hence those articles are published in rather technical papers where attention from practitioners and marketers is missing. Only the evolution and the data availability (i.e. structured-, unstructured web data, mobile and sensor data) is presented in a way that is easy to understand for practitioners and can be used as basis for the evaluation of a general technology approach for predictive analytics. However, there is no guidance on what to do with this data and how to implement the technologies that are explained in great technical details. The technologies which are explained most often are segmentation approaches, data mining, machine learning, classification trees, regressions and algorithms of any kind as well as some specific PA models which are tested for specific scenarios.</td>
<td>(Mishra &amp; Silakari, 2012)</td>
<td>The authors summarise the key essence of predictive analytics. Thereby it is stated that PA is the future of data mining and therefore data mining must be understood as data science and therefore needs a lot of expertise. After a short introduction of data mining predictive analytic techniques are introduced and the single steps of predictive models are explained. Moreover, the needed modelling processes are shortly explained before discussing possible applications. Lastly, the authors illustrate opportunities and challenges of PA.</td>
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## Definition and aspects of business performance

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<td>Business performance is discussed widely from a generic perspective as well as from a CRM specific standpoint. Even though the terminology varies between organisational and business performance, many articles relates business performance to profitability. Moreover, most academics incorporate a customer perspective as measurement of business performance which is key for the external market perspective of any business performance. A minority of articles mention other external factors as well (e.g. ROI calculations, shareholder value or market effectiveness). Narrowing down on the CRM perspective, a major distinction can be made between internal process efficiency and external perceived value. In many cases authors talk about customer benefits in general whereas some articles drill down and describe them in detail to assess business performance (i.e. customer acquisition, service and retention).</td>
<td>(Chang et al., 2010)</td>
<td>Investigating the impact of CRM technology on organisational performance, this study focuses on the mediating role of marketing capability. In fact, evidence is provided that CRM technology is positively related to marketing capabilities (marketing strategy and operational marketing activities) and that the marketing capability is positively related to performance (effectiveness and efficiency). Lastly, a customer-centric organisational culture and a corresponding management is positively related to the CRM technology use which leads to the conclusion, that management can directly influence organisational performance by creating a customer centric culture and thereby supporting CRM technology enhancing marketing capabilities.</td>
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<td>(Reinartz et al., 2004)</td>
<td>A model is developed, which describes the relationship between a three stage CRM processes (Relationship initiation, maintenance and termination) and the economic performance of an organisation from a perceptual and objective perspective with the industry as control factor. Moderators are thereby a CRM compatible organizational alignment and technology. Within this model the following hypotheses findings are generated. (1) The authors found that a strong economic performance is strongly associated with the degree of CRM processes implementation at the maintenance phase but only marginal within the support phase and non-existing for the termination phase. (2) A CRM-compatible organisation was identified as moderating effect on the CRM process economic performance within the termination stage. Moreover, a small effect on the initiation phase is identified but no influence could be found for the maintenance stage. (3) The CRM technology could be identified as driver for process economic performance only for the termination stage but not for the maintenance and initiate phase. In conclusion a sound CRM process model was developed and the positive effect of CRM on the business performance was partly proven with the strongest effect in the maintenance phase of CRM.</td>
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<td>(Kevin Jet al., 2014; Rapp et al., 2010)</td>
<td>The developed model measures the impact of CRM technology capabilities (which are dependent on business, human and technology resources) and customer orientation on customer linking capabilities. Customer linking capabilities are defined as the capability to identify customer needs and build appropriate relationships. In other words, it can be described as customer-relationship capabilities. Hence it is assumed that these capabilities have a direct influence on the customer relationship performance which again impacts the overall organisational performance. This model is tested, and the results are as follows: (1) CRM technology and customer orientation influence customer linking capabilities directly. (2) The impact of the customer linking capabilities on customer relationship management is confirmed. However, there is no direct impact on organisational performance. The impact on organisational performance is mediated through the customer relationship management performance and influenced by environmental factors.</td>
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<td>( Kim &amp; Kim, 2009)</td>
<td>The study develops a performance measurement framework as a CRM scorecard. Therefore, a theoretical causal map is developed and in a second step practically prioritised. After integrating the theoretical and practical perspective, measurement instruments are introduced and ranked according to the CRM success. As a result, a scorecard with five perspectives is established. This scorecard measures organisational performance (i.e. shareholder value, profitability and customer equity) with some key components from a customer, process and IT perspective. Finally, the scorecard is tested at a Korean bank.</td>
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Direct effect of CRM on business performance

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<td>When it comes to the measurement of CRM on business performance, the findings are heterogeneous. In general, authors agree that CRM influences the business performance. This is valid for internal process enhancements i.e. efficiency improvements as well as for external customer satisfaction i.e. higher retention rate, lower customer churn, etc. However, main studies contribute to the discussion whether the effect can be directly measured from a CRM perspective or if a mediating element is indispensable to achieve better business performance through CRM. Considering this mediating role, several studies provide different evidences on the influence of other components which must be considered when assessing business performance. On the one hand, those factors are introduced as external influence (i.e. industry, competition, etc.) and on the other hand internal firm components such as marketing capabilities, strategy, IT infrastructure and many more are being discussed.</td>
<td>(Schilke et al., 2009)</td>
<td>Business strategy is introduced as mediating element to measure business performance of CRM. The results indicate that CRM creates value by enhancing the business strategies which increases business performance and thereby has positive effects on customer satisfaction, market effectiveness and profitability. In other words, CRM has an indirect influence on business performance through business strategy and this influence is higher in highly commoditised industries.</td>
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<td>(Coltman et al., 2011)</td>
<td>A conceptual model is suggested that combines lower level capabilities such as IT infrastructure, human knowledge and business architecture as influencing factor for superior CRM capability paired with the strategic emphasis in CRM. Based on this model several hypotheses are drawn and tested with a survey questionnaire to evaluate business performance. Business performance is thereby defined as ROI, new product revenues, cost reduction and level of repeated business with valuable customers. The results show that the human knowledge has the highest correlation to the CRM capability and at the same business architecture is nearly equally correlated. IT infrastructure is statically not significant and there has no impact. The superior CRM capabilities again play a major role on the business unit performance while the strategic emphasis is correlated to the business unit performance when revenue growth and cost reduction is emphasised. In summary the study contributes three main results. (1) Contribution of IT to a CRM programme (not system) must be measured as combination between IT, human and business capabilities. (2) IT effort as standalone influencing factor does not have any statistically impact on a superior CRM capability. (3) CRM capability is a clear indicator for business performance, i.e. the better your CRM programme the more successful your organisation.</td>
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<td>(Rivard et al., 2006)</td>
<td>Based on an existing integrated model that combines the resource-based view and the competitive strategy, the influence of IT on the business performance is measured. This model states that firm assets have an influence on the strategy and the strategy has a correlation to the focused industry of an organisation. All three elements (firm assets, strategy and industry focus) do influence the market performance of an organisation and thereby its profitability. This logic is applied to information technology whereby the strategy and firm assets are considered from an IT perspective only. From a competitive strategy perspective, the overall business strategy effects the IT strategy and from a resource-based perspective the overall organisational infrastructure and processes effect the infrastructure and processes. Derived from this logic a research model is introduced to test the effect of IT support for strategy and IT support for firm assets with several sub-elements where IT supports (e.g. IT support for technological competencies). As an overall result a significant part (29%) of the market performance is due to the direct effect of IT support for strategy (competitive strategy perspective) and the indirect effect of IT support for firm assets (resource-based perspective).</td>
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<td>(O’Sullivan &amp; Abela, 2007)</td>
<td>In times of increasing pressure to demonstrate the own contribution to business performance this study investigates the marketing performance on the business performance. The main positive correlations that could be found is that marketing activities influence the marketing performance measurement more than the actual metrics for the activities. With that in mind, the hypotheses could be confirmed, that marketing performance measurement supports business performance, CEO satisfaction, return of assets and stock returns. The combination of marketing performance measurements (activities and metrics) with dashboards do not have any influence on the above-mentioned factors.</td>
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<td>(Kevin et al., 2014; Rapp et al., 2010)</td>
<td>The developed model measures the impact of CRM technology capabilities (which are dependent on business, human and technology resources) and customer orientation on customer linking capabilities. Customer linking capabilities are defined as the capability to identify customer needs and build appropriate relationships. In other words, it can be described as customer-relationship capabilities. Hence it is assumed that these capabilities have a direct influence on the customer relationship performance which again impacts the overall organisational performance. This model is tested, and the results are as follows: (1) CRM technology and customer orientation influence customer linking capabilities directly. (2) The impact of the customer linking capabilities on customer relationship management is confirmed. However, there is no direct impact on organisational performance. The impact on organisational performance is mediated through the customer relationship management performance and influenced by environmental factors.</td>
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<td>(Hendricks et al., 2007)</td>
<td>The article focuses on the effect of enterprise systems (ERP, supply chain and CRM). Based on the company’s announcement of the corresponding system implementation (ERP, SCM and CRM) the stock returns and profitability were measured before, during and after the implementation and the results are mixed. While there is a positive effect when implementing ERP and SCM, no evidence could be found that CRM has a significant effect on stock return or profitability.</td>
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### Indirect effects of CRM on business performance: Mediating elements

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<td>Within the discussion about CRM and business performance, many mediating elements are introduced from different authors. On a higher conceptual level, it can be summaries that an architectural element is needed (e.g. IT infrastructure, CRM technology, etc.) and that customer centric business process and organisational structures do enhance the effect of CRM on business performance. However, on a more specific level different authors are focusing on different mediating elements. Some focus strongly on the marketing capabilities and illustrate that this has the biggest effect while others are considering the customer perspective such as the established relationship. Moreover, increasing attention is spent on the role of strategy that effects the business performance. In conclusion, all authors agree that CRM mostly influences firm performance but that mediating elements must be considered. In other words, CRM alone cannot have a direct and significant effect.</td>
<td>(Schilke et al., 2009)</td>
<td>Business strategy is introduced as mediating element to measure business performance of CRM. The results indicate that CRM creates value by enhancing the business strategies which increases business performance and thereby has positive effects on customer satisfaction, market effectiveness and profitability. In other words, CRM has an indirect influence on business performance through business strategy and this influence is higher in highly commoditised industries.</td>
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<td>(Chang et al., 2010)</td>
<td>Investigating the impact of CRM technology on organisational performance, this study focuses on the mediating role of marketing capability. In fact, evidence is provided that CRM technology is positively related to marketing capabilities (marketing strategy and operational marketing activities) and that the marketing capability is positively related to performance (effectiveness and efficiency). Lastly, a customer-centric organisational culture and a corresponding management is positively related to the CRM technology use which leads to the conclusion, that management can directly influence organisational performance by creating a customer centric culture and thereby supporting CRM technology enhancing marketing capabilities.</td>
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<td></td>
<td>(Michael Rodriguez &amp; Honeycutt, 2011)</td>
<td>This article examines the impact of CRM technology on sales professionals’ ability to collaborate with internal stakeholders in B2B organisations and assesses the relationship between CRM utilization and sales performance. With 115-questionnaire survey 70 participants tested the following hypotheses. First, they confirmed that there is a positive correlation between CRM utilisation and the performance with customers (i.e. sales professionals develop relationships with customers based on their needs for a solution). Next, the sales process effectiveness (i.e. close deals faster) and the sales professional’s ability to collaborate internally were associated with CRM utilisation and the correlations were positive for both scenarios. Based on the increased collaboration (due to CRM utilisation) the authors state, that customer performance is positively affected but there is no correlation between collaboration and sales process effectiveness.</td>
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<td><strong>(Rivard et al., 2006)</strong></td>
<td>Based on an existing integrated model that combines the resource-based view and the competitive strategy, the influence of IT on the business performance is measured. This model states that firm assets have an influence on the strategy and the strategy has a correlation to the focused industry of an organisation. All three elements (firm assets, strategy and industry focus) do influence the market performance of an organisation and thereby its profitability. This logic is applied to information technology whereby the strategy and firm assets are considered from an IT perspective only. From a competitive strategy perspective, the overall business strategy effects the IT strategy and from a resource-based perspective the overall organisational infrastructure and processes effect the infrastructure and processes. Derived from this logic a research model is introduced to test the effect of IT support for strategy and IT support for firm assets with several sub-elements where IT supports (e.g. IT support for technological competencies). As an overall result a significant part (29%) of the market performance is due to the direct effect of IT support for strategy (competitive strategy perspective) and the indirect effect of IT support for firm assets (resource-based perspective).</td>
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<td><strong>(Reinartz et al., 2004)</strong></td>
<td>A model is developed, which describes the relationship between a three stage CRM processes (Relationship initiation, maintenance and termination) and the economic performance of an organisation from a perceptual and objective perspective with the industry as control factor. Moderators are thereby a CRM compatible organizational alignment and technology. Within this model the following hypotheses findings are generated. (1) The authors found that a strong economic performance is strongly associated with the degree of CRM processes implementation at the maintenance phase but only marginal within the support phase and non-existing for the termination phase. (2) A CRM-compatible organisation was identified as moderating effect on the CRM process economic performance within the termination stage. Moreover, a small effect on the initiation phase is identified but no influence could be found for the maintenance stage. (3) The CRM technology could be identified as driver for process economic performance only for the termination stage but not for the maintenance and initiate phase. In conclusion a sound CRM process model was developed and the positive effect of CRM on the business performance was partly proven with the strongest effect in the maintenance phase of CRM.</td>
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Measurements & Scorecards

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<td>If business performance should be evaluated, the measurement approach and the corresponding metrics must be considered. Within recent literature there are some approaches to measure the effect of CRM on business performance. Mostly a scorecard approach is presented which incorporates different indicators. Some authors focus on a more strategic level and evaluate how human knowledge, strategy, customers, processes and IT influence the effect. Other focus more on one of those topics and specifically consider the impact on customers in the different stages. Overall no consensus could be identified to specify key indicators for the measurement of business performance.</td>
<td>(Kim et al., 2003)</td>
<td>Development of a customer-centric scorecard to measure the effectiveness of CRM. After drawing a holistic and powerful generic model of possible CRM evaluations the necessary cause-and-effect relationships are illustrated and linked to customer-centric perspectives of the score card. The comparison of customer- and business centric perspectives business scorecards indicates that the measurement of CRM can focus internal company metrics or external customer metrics, that have an impact on the company performance as well. Focusing on the customer-centric BSC metrics were developed for each perspective (customer value, satisfaction, interaction and knowledge). Those metrics are applied in a case study and more insights about CRM strategy were generated.</td>
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<td>(Kim &amp; Kim, 2009)</td>
<td>The study develops a performance measurement framework as a CRM scorecard. Therefore, a theoretical causal map is developed and in a second step practically prioritised. After integrating the theoretical and practical perspective, measurement instruments are introduced and ranked according to the CRM success. As a result, a scorecard with five perspectives is established. This scorecard measures organisational performance (i.e. shareholder value, profitability and customer equity) with some key components from a customer, process and IT perspective. Finally, the scorecard is tested at a Korean bank.</td>
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<td>(Kevin et al., 2014)</td>
<td>The developed model measures the impact of CRM technology capabilities (which are dependent on business, human and technology resources) and customer orientation on customer linking capabilities. Customer linking capabilities are defined as the capability to identify customer needs and build appropriate relationships. In other words, it can be described as customer-relationship capabilities. Hence it is assumed that these capabilities have a direct influence on the customer relationship performance which again impacts the overall organisational performance. This model is tested, and the results are as follows: (1) CRM technology and customer orientation influence customer linking capabilities directly. (2) The impact of the customer linking capabilities on customer relationship management is confirmed. However, there is no direct impact on organisational performance. The impact on organisational performance is mediated through the customer relationship management performance and influenced by environmental factors.</td>
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### Appendix 2: Direct effects of CRM on BP

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<tr>
<th>Benefit of CRM</th>
<th>Direct impact on BP</th>
<th>Author(s)</th>
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<tr>
<td><strong>1. Internal efficiency</strong></td>
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<tr>
<td>- Information generation and dissemination</td>
<td>- Improvement of technical efficiency</td>
<td>(Josiassen et al., 2014)</td>
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<td>- Responsiveness</td>
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<tr>
<td>- Better sales activity controlling</td>
<td>- Improved sales efficiency and enhanced collaboration</td>
<td>(Li &amp; Mao, 2012)</td>
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<td>- enhance knowledge management</td>
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<td>- better customer master data</td>
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<tr>
<td>- Plan and implement marketing activities structurally</td>
<td>- Improved business performance and higher CEO satisfaction</td>
<td>(O’Sullivan &amp; Abela, 2007)</td>
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<td>- Monitor and measure marketing activities</td>
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<td>- CRM usage enhances better internal collaboration</td>
<td>- Sales staff can understand clients better and offer tailored solutions</td>
<td>(Michael Rodriguez &amp; Honeycutt, 2011)</td>
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<td>- Integration of CRM processes during relationship initiation, maintenance and termination.</td>
<td>- The more processes are integrated the higher the economic performance</td>
<td>(Reinartz et al., 2004)</td>
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<td><strong>2. External customer satisfaction</strong></td>
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<tr>
<td>- capturing of customer information</td>
<td>- More customer acquisitions</td>
<td>(Kim et al., 2003)</td>
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<td>- profiles and segments customers</td>
<td>- Higher customer loyalty</td>
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<td>- specific activities and customer care programmes</td>
<td>- Increased profits</td>
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<td>- integrated channel management</td>
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<tr>
<td>- CRM usage increases customer performance</td>
<td>- Higher customer performance improves sales and business performance</td>
<td>(Reinartz et al., 2004)</td>
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<tr>
<td><strong>Within the operational CRM usage</strong></td>
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<td>- Order handling</td>
<td>- Higher marketing operational performance leads to higher customer satisfaction</td>
<td>(Zeynep Ata &amp; Toker, 2012)</td>
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<td>- Complaint management</td>
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<td>- Pre/ Post Sales integration</td>
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<td>- Marketing processes</td>
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<td>- Customised offerings and more professional information providing</td>
<td>- Customer satisfaction increases and is mediated by customer knowledge and BP improves</td>
<td>(Mithas et al., 2005)</td>
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<tr>
<td>- Faster processing of quotes and orders</td>
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<td>- The enhanced capabilities to manage relationships systematically with IT support.</td>
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<td>- CRM supports a behaviour of employees that strengthen the relationship to clients</td>
<td>- Customer satisfaction increases due to better relationship and commitment of employees</td>
<td>(Long et al., 2013)</td>
</tr>
<tr>
<td>- CRM supports the development of relationships by managing information and activities about clients, products, services, complaints etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. Financial performance: revenues, margins and profits</strong></td>
<td></td>
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</tr>
<tr>
<td>- IT by itself has no significant impact on CRM capabilities, but it is a clear indicator for business performance</td>
<td>- Organisations with well-established CRM programmes deliver better financial results</td>
<td>(Coltman et al., 2011)</td>
</tr>
<tr>
<td>- Strategic CRM influences the profitability efficiency and cost efficiency</td>
<td>- CRM has a positive effect on profit efficiency, and it increases over time; i.e. the earlier an organisation engages in strategic CRM the higher the profit efficiency</td>
<td>(Krasnikov et al., 2009)</td>
</tr>
<tr>
<td>- Early adoption has an influence on profitability efficiency and cost efficiency</td>
<td>- CRM has a positive effect on cost efficiency, but strategy lowers the degree of cost efficiency</td>
<td></td>
</tr>
<tr>
<td>- CRM and its customer linking activities generate some effects on organisational performance</td>
<td>- CRM performance has a direct effect on organisational performance</td>
<td>(Rapp et al., 2010)</td>
</tr>
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</table>
Appendix 3: Mediating elements and their indirect effects on BP

<table>
<thead>
<tr>
<th>Mediating element</th>
<th>Impact on the association to BP</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- CRM-compatible organisation</td>
<td>Dependent on the CRM process stage these mediating elements influence BP.</td>
<td>(Reinartz et al., 2004)</td>
</tr>
<tr>
<td>- CRM technology</td>
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<tr>
<td>- Marketing Capabilities</td>
<td>Strong marketing capabilities influence the business performance when using CRM technology.</td>
<td>(Chang et al., 2010)</td>
</tr>
<tr>
<td>- Customer linking-capabilities</td>
<td>Customer linking-capabilities has a direct impact on the CRM performance and thereby influences BP as well. The environmental dynamism has a direct impact on BP.</td>
<td>(Rapp et al., 2010)</td>
</tr>
<tr>
<td>- environmental dynamism</td>
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<tr>
<td>- Competition / environmental</td>
<td>The higher the competition / dynamism the more negative the effect on customer satisfaction and BP.</td>
<td>(Zeynep Ata &amp; Toker, 2012)</td>
</tr>
<tr>
<td>- environmental dynamism</td>
<td></td>
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</tr>
<tr>
<td>- Relationship quality</td>
<td>The correlation between customer satisfaction and customer retention is affected by the quality of the relationship.</td>
<td>(Hennig-Thurau &amp; Klee, 1997)</td>
</tr>
<tr>
<td>- Customer knowledge</td>
<td>Customer knowledge influences the association between the technical CRM application and the customer satisfaction.</td>
<td>(Mithas et al., 2005)</td>
</tr>
<tr>
<td>- Differentiation</td>
<td>Differentiation and cost leadership mediate BP, especially in high commodity industries.</td>
<td>(Schilke et al., 2009)</td>
</tr>
<tr>
<td>- Cost leadership</td>
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<tr>
<td>- IT Support for Firm assets</td>
<td>IT support for firm assets and strategy as well as the industry forces influence the market performance and profitability.</td>
<td>(Rivard et al., 2006)</td>
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<tr>
<td>- Industry forces</td>
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<td>- IT Support for Strategy</td>
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## Appendix 4: Operationalisation of CRM and BP constructs

<table>
<thead>
<tr>
<th>Sub-Elements</th>
<th>Variables, i.e. Questionnaire items</th>
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<tbody>
<tr>
<td><strong>(A) CRM Strategy</strong></td>
<td>The following questions are aiming at the strategic perspective of your CRM!</td>
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<tr>
<td>(1) Integration of customer processes and classifications into the software</td>
<td>(1a) My organisation has aligned the CRM processes along the customers processes</td>
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<tr>
<td>(2) Consideration of all customer channels</td>
<td>(1b) Our CRM / sales strategy considers different customer approaches according to specific customer groups</td>
</tr>
<tr>
<td>(3) Focus on customer value adding activities within CRM across the value chain</td>
<td>(1c) Our CRM system considers different processes according to different customer groups</td>
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<tr>
<td>(4) Constant synchronisation of customer requirements and market potential</td>
<td>(2a) Our organisation sells products across multiple channels (e.g. web shop, tele-sales, outside sales, distribution)</td>
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<tr>
<td>(5) Development and updateability of technology</td>
<td>(2b) Our CRM system supports all sales channels</td>
</tr>
<tr>
<td><strong>(B) CRM Planning and Implementation</strong></td>
<td>(3a) Our CRM system supports all main activities within the core customer functionalities i.e. marketing, sales and service</td>
</tr>
<tr>
<td>(1) Availability and acceptance of modern technology</td>
<td>(3b) Our CRM system requires mainly data entries that are not relevant for our clients but important for internal processes and reporting</td>
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<tr>
<td>(2) Support of innovation / new ideas</td>
<td>(4a) All CRM users can suggest improvements for our systems</td>
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<td>(3) Coherent training and change management concept</td>
<td>(4b) We focus mainly on our customers when defining CRM requirements.</td>
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<tr>
<td>(4) Customer centric business process management and changes</td>
<td>(4c) There are regular updates of our CRM system that include functional improvements</td>
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<tr>
<td>(5) Communication and project management</td>
<td>(5a) Our organisation uses a ‘state-of-the-art’ CRM software (i.e. Implemented after 2010).</td>
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<td></td>
<td>(5b) Our CRM technology evolves regularly (i.e. with annual updates)</td>
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<tr>
<td></td>
<td>(5c) We use modern technology applications (e.g. Business Intelligence, predictive analytics, social media, mobile devices, artificial intelligence) within our CRM system already</td>
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</table>
### (A) Analytical CRM

1. Availability of analytical technologies
2. Standardised usage of analytical applications
3. Availability of PA technologies
4. Standardised usage of PA applications

The following questions are aiming at the usage of analytical elements within your CRM system!

1. Our organisation is using analytical technologies (e.g. XXX) within CRM structured and regularly.
   Additional selection: Which of the following technologies are used?
2. Our organisation is using analytical applications (e.g. XXX) within CRM structured and regularly.
   Additional selection: Which of the following applications are used?

### (B) CRM Success Measurement

1. Measurement of CRM implementation success / ROI calculation
2. Measurement and ongoing monitoring of implemented CRM Systems

The following questions are aiming at the measurement of CRM success during the implementation phase.

1. The CRM implementation was monitored regularly in our organisation
2. CRM Benefits (e.g. # of generated leads; reduction of sales process lead time) were defined and measured during the implementation.
3. All costs regarding the CRM implementation (e.g. licenses or personnel) were monitored during the implementation.
4. At the end of the implementation, a final cost-benefit comparison or ROI calculation was made to determine the financial success of the implementation.

The following questions are aiming at the measurement of CRM success after the implementation phase; i.e. during the productive usage of the software.

1. Our organisation has implemented a systematic measurement to monitor and improve the CRM system from a technical perspective?
   Additional selection: Which of the following components* are being measured / monitored?
2. Our organisation has implemented a systematic measurement to monitor and improve the CRM system from a functional perspective?
   Additional selection: Which of the following components* are being measured / monitored?

### (C) Internal process

1. Enhanced collaboration and communication within the organisation
2. Better customer information management
3. Faster internal process lead times

1. Our CRM users are communicating mainly through the system when talking to colleagues who are using CRM as well, instead of using emails.
2. We use our CRM System to assign tasks and to track all customer activities, such as emails and phone calls.
3. Overall, our collaboration has improved with the implementation and usage of our CRM System.
4. All relevant customer information are stored in our CRM system and the data is mostly up-to-date (i.e. reliable and valid).
5. The majority of our CRM users can find customer information easily and quickly at any time and from any location (i.e. also mobile available)
6. Overall, our customer information management has improved with the implementation and usage of our CRM System.
7. Our organisation can track process lead times of all major internal customer processes (e.g. lead to opportunity, opportunity to quote, quote to order).
8. Our CRM system accelerates internal business processes in marketing, sales and service; i.e. we are faster when using the system.
9. Our CRM system improves internal business processes in marketing, sales and service; i.e. we are better (in terms of quality) when using the system.
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<th>(F) External customer satisfaction</th>
<th>(G) Financial performance</th>
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<td>(1) Conduct annual customer surveys (2) High referral rate; i.e. high percentage of repetitive customers (3) Good company ratings especially in comparison to direct competition (4) Fast process / response time; e.g. in customer service</td>
<td>(1) Annual turnover and margin growth (2) Higher turnover per employee (3) Better conversion rates in marketing, sales, service</td>
</tr>
<tr>
<td>(1a) Our customer satisfaction is measured regularly and made transparent to all employees who are in customer contact (1b) Our external customer satisfaction increases with the usage of our CRM System. (1c) We use our CRM system to conduct, measure or display customer satisfaction. (2a) We ask our customers pro-actively for referrals and advertise them in publicity (e.g. website). (2b) The majority (more than 70%) of our customers are repetitive customers and buy our products regularly. (2c) Our customer recommends our products / services and share their experiences in publicity (e.g. website, forums, etc.). (3a) Our organisation is very dependent (i.e. it makes a big impact) on ratings of products or services (3b) Our organisation is well rated in all relevant marketplaces / platforms (e.g. amazon or industry-specific websites) and thereby better positions as most of our competitors. (3c) We collect and communicate all customer ratings pro-actively to all employees who are in customer contact. (3d) We use our CRM system to analyse or display customer ratings. (4a) Our organisation can track process times of all major external customer processes; i.e. processes where the customer is waiting for an answer or feedback, such as response time in customer services, follow-up time of quotes/orders, etc.). (4b) Our CRM system shortens the waiting time for customers. (4c) Our CRM System atomises response activities to reduce waiting times (i.e. automatic follow-up emails).</td>
<td>(1a) Please indicate the average annual turnover growth of your organisation in the last three years (1b) Please indicate the average annual margin growth of your organisation in the last three years (1c) Our CRM system supports the annual turnover growth of our organisation (1d) Our CRM system supports annual margin growth of our organisation (2a) Please indicate the annual performance increase per employee; i.e. how much more could they achieve (e.g. generated leads, turnover, answered customer service cases, etc.) (2b) Due to our CRM system, we are able to achieve a higher performance increase per employee (e.g. generated leads, turnover, answered customer service cases, etc.. (3a) Please indicate the following conversion rates in your customer processes - Click rate per Email - Open rate per Email - Marketing activity (e.g. e-mail campaign) to lead - Lead to opportunity - Opportunity to quote - Quote to order - Customer inquiries per sold product - Resolved customer inquiries (3b) Our CRM System improves our conversion rates in marketing, sales and service</td>
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Appendix 5: Final questionnaire (EN) with sample-answers

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<tr>
<th>Question</th>
<th>Answer</th>
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<tr>
<td>1. Please indicate the approx. total number of employees of your organisation</td>
<td>2000</td>
</tr>
<tr>
<td>2. Is your organisation mainly operating in a business-to-business environment?</td>
<td>yes</td>
</tr>
<tr>
<td>3. Please select your experience with CRM in years</td>
<td>4 - 6 years</td>
</tr>
<tr>
<td>4. Please indicate the approx. size of your organisation in annual revenue</td>
<td>100000m€</td>
</tr>
<tr>
<td>5. In which city is your headquarter based?</td>
<td>Munich</td>
</tr>
<tr>
<td>6. When was the company you are working for founded?</td>
<td>1954</td>
</tr>
<tr>
<td>7. Please select the industry you are operating in</td>
<td>Energy Storage</td>
</tr>
<tr>
<td>8. Is your organisation family-owned?</td>
<td>yes</td>
</tr>
<tr>
<td>9. For how many years is your organisation using CRM?</td>
<td>10</td>
</tr>
<tr>
<td>10. How many employees are using CRM actively approximately?</td>
<td>1000</td>
</tr>
<tr>
<td>11. Which CRM system is your organisation using (E.g. MSD, Salesforce, SAP) ?</td>
<td>Sugar CRM</td>
</tr>
<tr>
<td>12. Please select your department</td>
<td>Sales</td>
</tr>
<tr>
<td>13. Please select your job position</td>
<td>Manager</td>
</tr>
<tr>
<td>14. Please name your job role (e.g. Inside Sales, Social Media Expert, etc.)</td>
<td>Regional Sales Manager</td>
</tr>
<tr>
<td>15. How long have you been working in this role?</td>
<td>4 - 6 years</td>
</tr>
</tbody>
</table>

CRM

This section aims to investigate the CRM strategy, implementation, usage and measurement in your organisation within marketing, sales and customer service. Thereby questions are being asked about the CRM strategy definition (part A), the planning and implementation of your CRM system (part B), the usage of analytical technologies and applications (part C) and the measurement of your CRM strategy / success (part D).

A.) The following questions are aiming at the strategic perspective of your CRM:

1.) Our CRM strategy targets different customer groups
   - [ ] Strongly agree [ ] Midly agree [ ] Agree [ ] Neither agree nor disagree [ ] Disagree [ ] Midly disagree [ ] Strongly disagree

2.) Our CRM strategy utilizes different sales channels (i.e. considers direct, indirect, online and other sales channels)
   - [ ] Strongly agree [ ] Midly agree [ ] Agree [ ] Neither agree nor disagree [ ] Disagree [ ] Midly disagree [ ] Strongly disagree

3.) Our CRM strategy incorporates up-to-date information technology (e.g. bandwith, SaaS, mobility)
   - [ ] Strongly agree [ ] Midly agree [ ] Agree [ ] Neither agree nor disagree [ ] Disagree [ ] Midly disagree [ ] Strongly disagree

4.) Our CRM strategy includes customer feedback (e.g. from customer surveys)
   - [ ] Strongly agree [ ] Midly agree [ ] Agree [ ] Neither agree nor disagree [ ] Disagree [ ] Midly disagree [ ] Strongly disagree

5.) Our CRM strategy is derived from the overarching business strategy / vision
   - [ ] Strongly agree [ ] Midly agree [ ] Agree [ ] Neither agree nor disagree [ ] Disagree [ ] Midly disagree [ ] Strongly disagree
B.) The following questions are aiming at the CRM system implementation and its planning:

1.) Our CRM system implementation followed a clear process to define requirements:
   - [ ] Strongly agree
   - [ ] Midly agree
   - [ ] Agree
   - [ ] Neither agree nor disagree
   - [x] Disagree
   - [ ] Midly disagree
   - [ ] Strongly disagree

2.) Our CRM system implementation has developed a clear training programme
   - [ ] Strongly agree
   - [ ] Midly agree
   - [ ] Agree
   - [ ] Neither agree nor disagree
   - [ ] Disagree
   - [ ] Midly disagree
   - [ ] Strongly disagree

3.) Our CRM system implementation included a clear change management programme
   - [ ] Strongly agree
   - [ ] Midly agree
   - [ ] Agree
   - [ ] Neither agree nor disagree
   - [ ] Disagree
   - [ ] Midly disagree
   - [ ] Strongly disagree

4.) Our CRM system implementation was communicated through a clearly defined process
   e.g. newsletter about project progress, communication of roles, responsibilities and milestones, escalation process, etc.
   - [ ] Strongly agree
   - [ ] Midly agree
   - [ ] Agree
   - [ ] Neither agree nor disagree
   - [ ] Disagree
   - [ ] Midly disagree
   - [ ] Strongly disagree

5.) Our CRM system implementation appointed a dedicated project management
   - [ ] Strongly agree
   - [ ] Midly agree
   - [ ] Agree
   - [ ] Neither agree nor disagree
   - [ ] Disagree
   - [ ] Midly disagree
   - [ ] Strongly disagree

C.1.) The following questions are aiming at the usage of analytical technologies within your CRM system:

1.) Our CRM system uses clustering (~ sort something into pre-defined groups) as analytical technology
   e.g. Sort customers into customer groups, such as retail-customers, direct-customers, etc.
   - [ ] Strongly agree
   - [ ] Midly agree
   - [ ] Agree
   - [ ] Neither agree nor disagree
   - [ ] Disagree
   - [ ] Midly disagree
   - [ ] Strongly disagree

2.) Our CRM system uses classification (~ build groups based on the data) as analytical technology
   e.g. build A;B;C; customer groups according to generated revenue
   - [ ] Strongly agree
   - [ ] Midly agree
   - [ ] Agree
   - [ ] Neither agree nor disagree
   - [ ] Disagree
   - [ ] Midly disagree
   - [ ] Strongly disagree

3.) Our CRM system uses forecasting as analytical technology
   e.g. forecast revenue until the end of the year
   - [ ] Strongly agree
   - [ ] Midly agree
   - [ ] Agree
   - [ ] Neither agree nor disagree
   - [ ] Disagree
   - [ ] Midly disagree
   - [ ] Strongly disagree

4.) Our CRM system uses data visualisation as analytical technology
   e.g. trendlines for forecasted revenue, sales funnel, etc.
   - [ ] Strongly agree
   - [ ] Midly agree
   - [ ] Agree
   - [ ] Neither agree nor disagree
   - [ ] Disagree
   - [ ] Midly disagree
   - [ ] Strongly disagree

5.) Our CRM system uses predictive analytics as technology
   e.g. predict customer churn rate or next best offer
   - [ ] Strongly agree
   - [ ] Midly agree
   - [ ] Agree
   - [ ] Neither agree nor disagree
   - [ ] Disagree
   - [ ] Midly disagree
   - [ ] Strongly disagree
C.2.) The following questions are aiming at the usage of analysis within your CRM system:

1.) Our CRM system monitors sales revenues

2.) Our CRM system monitors marketing campaigns

3.) Our CRM system monitors customer activities (e.g. customer visits or complaints)

4.) Our CRM system monitors customer loyalty

5.) Our CRM system monitors cross- and up-selling

6.) Our CRM system monitors reasons for customer complaints

D.) The following questions are aiming at the measurement of your CRM; i.e. the success of CRM:

1.) Our CRM strategy measures system implementation / non-operating costs
   e.g. training, IT development, change management

2.) Our CRM strategy measures system operating costs
   e.g. cloud consumption, licenses

3.) Our CRM strategy measures internal improvements
   e.g. reduction of process lead times

4.) Our CRM strategy measures external improvements
   e.g. increase of customer satisfaction

5.) Our CRM strategy measures financial improvements
   e.g. increase of sales revenue
### Business Performance

The following section aims to investigate business performance indicators to identify associations between the CRM concepts above and firm performance. Thereby questions are being asked about internal business processes (part E), external customer satisfaction (part F) and financial performance (part G). All questions are related to the performance of your organisation compared to your nearest competitors. Thereby your subjective opinion is being asked and no objective or factual knowledge about your competitors is required.

#### E.) Relatively to your nearest competitors, please indicate the performances of your organisation in the following areas of internal business processes:

1.) The **collaboration** between marketing, sales and customer service  
   (*Collaboration is defined as 'joint work' on a customer across and within the departments of marketing, sales and customer service.*)

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2.) The **effectiveness of internal communication**

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3.) The **accessibility** of customer information,  
   *i.e. all employees know where to find relevant customer information and can access them*

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4.) The average **lead time of your customer processes** in marketing, sales and customer service  
   *e.g. process lead time for quote creation or brochure dispatching*

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5.) The **perceived employee satisfaction**

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6.) The **complexity of all business processes** in marketing, sales and customer services  
   *e.g. the higher the amount of process variation, the higher the complexity and the lower the process lead time*

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F.) Relatively to your nearest competitors, please indicate the performances of your organisation in the following areas of external customer satisfaction:

1.) The percentage of customer survey responses  
*i.e. 1 out of 100 customers answers a regular survey*

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2.) The percentage of customer referrals  
*i.e. 1 out of 1000 customers provides a referral*

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3.) The percentage of positive customer rating on public websites  
*e.g. 1 out of 1000 customers provides a positive rating on amazon*

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4.) The average response time to your customers  
*i.e. waiting time for your customer until the first qualified response*

<table>
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<th>much worse</th>
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5.) The percentage of customer complaints,  
*i.e. 1 out of 1000 customer complains*

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6.) The percentage of repeat / loyal customers  
*i.e. 1 out of 1000 customers repurchases your products / services*

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G.) Relatively to your nearest competitors, please indicate the performances of your organisation in the following areas of financial performance:

1.) The total costs of all customer processes in marketing, sales and service  
*i.e. all fix and variable costs/ total cost of ownerships for CRM*

<table>
<thead>
<tr>
<th>much worse</th>
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2.) The sales revenue (i.e. turnover)

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3.) The conversion rate from lead to order  
*i.e. 1 out of 100 leads will be converted to an order*

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4.) The overall net profit margin

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<tr>
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5.) The average market share

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<tr>
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</tbody>
</table>
## Appendix 6: Overview of Panel Providers

<table>
<thead>
<tr>
<th>Provider</th>
<th>Programming / Survey</th>
<th>Fieldwork &amp; Panel</th>
<th>Tabulation</th>
<th>Others</th>
<th>Total Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIK</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>BTG</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Evolution Online</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Forum Mainz</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>GPD Gruppe</td>
<td>0,00 €</td>
<td>5.700,00 €</td>
<td>0,00 €</td>
<td>0,00 €</td>
<td>5.700,00 €</td>
</tr>
<tr>
<td>GFK</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
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<tr>
<td>G-I-M</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
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<tr>
<td>IWD Market Research</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
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<tr>
<td>Vocatus</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
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<tr>
<td>K&amp;A Research</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>DynData / Research Now</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
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<tr>
<td>KPMG</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
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<tr>
<td>Schmiedl Research</td>
<td>1.000,00 €</td>
<td>5.600,00 €</td>
<td>800,00 €</td>
<td>250,00</td>
<td>7.650,00 €</td>
</tr>
<tr>
<td><strong>Bilendi</strong></td>
<td><strong>1.424,00 €</strong></td>
<td><strong>2.396,00 €</strong></td>
<td><strong>900,00 €</strong></td>
<td><strong>0,00 €</strong></td>
<td><strong>4.720,00 €</strong></td>
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<tr>
<td>Respondi</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
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<tr>
<td>Light Speed Research</td>
<td>1.226,00 €</td>
<td>2.200,00 €</td>
<td>0,00 €</td>
<td>510,00</td>
<td>3.936,00 €</td>
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FAVOURABLE ETHICAL OPINION

Study Title: EFFECTS OF ACRM IMPLEMENTATION ON LARGE Sized ENTERPRISES' BUSINESS PERFORMANCE IN THE GERMAN B2B 'MITTELSTAND' SECTOR

Reference Number: BAL/2019/6/KERN

Date Resubmitted: 19th March 2019

Thank you for resubmitting your application to the Faculty Ethics Committee and for making the requested changes/clarifications.

I am pleased to inform you that the Faculty Ethics Committee was content to grant a favourable ethical opinion of the above research on the basis described in the submitted documents listed at Annex A, subject to standard general conditions (See Annex B)

Please note that the favourable opinion of the Faculty Ethics Committee does not grant permission or approval to undertake the research/work. Management permission or approval must be obtained from any host organisation, including the University of Portsmouth or supervisor, prior to the start of the study.

Wishing you every success in your research

Peter Scott, Chair of the Faculty of Business and Law Ethics Committee

Annexes
A - Documents reviewed
B - After ethical review

ANNEX A Documents reviewed

The documents ethically reviewed for this application
ANNEX B - After ethical review

1. This Annex sets out important guidance for those with a favourable opinion from a University of Portsmouth Ethics Committee. Please read the guidance carefully. A failure to follow the guidance could lead to the committee reviewing and possibly revoking its opinion on the research.

2. It is assumed that the work will commence within 1 year of the date of the favourable ethical opinion or the start date stated in the application, whichever is the latest.

3. The work must not commence until the researcher has obtained any necessary management permissions or approvals – this is particularly pertinent in cases of research hosted by external organisations. The appropriate head of department should be aware of a member of staff’s plans.

4. If it is proposed to extend the duration of the study beyond that stated in the application, the Ethics Committee must be informed.

5. Any proposed substantial amendments must be submitted to the Ethics Committee for review. A substantial amendment is any amendment to the terms of the application for ethical review, or to the protocol or other supporting documentation approved by the Committee that is likely to affect to a significant degree:
   - (a) the safety or physical or mental integrity of participants
   - (b) the scientific value of the study
   - (c) the conduct or management of the study.

5.1 A substantial amendment should not be implemented until a favourable ethical opinion has been given by the Committee.

6. At the end of the work a final report should be submitted to the ethics committee. A template for this can be found on the University Ethics webpage.

7. Researchers are reminded of the University’s commitments as stated in the Concordat to Support Research Integrity viz:
   - maintaining the highest standards of rigour and integrity in all aspects of research
   - ensuring that research is conducted according to appropriate ethical, legal and professional frameworks, obligations and standards
   - supporting a research environment that is underpinned by a culture of integrity and based on good governance, best practice and support for the development of researchers
   - using transparent, robust and fair processes to deal with allegations of research misconduct should they arise
   - working together to strengthen the integrity of research and to reviewing progress regularly and openly.

8. In ensuring that it meets these commitments the University has adopted the UKRI Code of Practice for Research. Any breach of this code may be considered as misconduct and may be investigated following the University Procedure for the Investigation of Allegations of Misconduct in Research. Researchers are advised to use the UKRI checklist as a simple guide to integrity.
Application for Ethics Review – Staff and Postgraduate Students

1. Study Title and Key Dates

1.1 Title

EFFECTS OF ACRM IMPLEMENTATION ON LARGE Sized ENTERPRISES’ BUSINESS PERFORMANCE IN THE GERMAN B2B ‘MITTELSTAND’ SECTOR

1.2 Key Dates

Date of original submission to ethics committee: 2019.02.18
Version number of original submission: 1.0
Ethics Committee Reference Number:

Intended Start Date of Data Collection: 25th of March 2019
Expected Finish Date of Data Collection: 8th of April 2019

When resubmitting an updated application (e.g. in response to ethical review, or an application for substantial amendment):

Date of resubmission to ethics committee: 2019.03.19
Version number of resubmitted documents: V3

2. Applicant Details

2.1 Principal Investigator

Name: Manuel Kern
Title /Role /Course of study: DBA Professional Research and Development Project (2017); U25645-17YR, U25646-17YR
Department: Marketing
Faculty: Portsmouth Business School
Telephone: +49 1601502120
Email: up838685@myport.ac.uk / mankern@outlook.com

Has the principal investigator attended the graduate school (for students) or researcher development programme (for staff) research ethics training session?

Yes, within teaching year 1 of the DBA programme.

2.2 Supervisor (if Principal Investigator is a student or a research assistant)
Name: Dr. Giampaolo Viglia  
Title /Role: Reader in Marketing / Research Area Leader

Department: Marketing and Sales  
Faculty: Portsmouth Business School

Telephone: 023 9284 4148  
Email: Giampaolo.viglia@port.ac.uk

Names and email of any other supervisors:

Prof. Yuksel Ekinci – Senior Supervisor and counterpart for methodological topics

Prof. Marco Schmaeh – Supervisor from ESB university and counterpart for industry-specific topics

Has the supervisor attended the researcher development programme research ethics training session?  
Yes – January 2017

2.3 Others involved in the work/research including students and/or external collaborators
(name, organisation/course, role in the project)

Alexander Koestner – Leuco GmbH – Native Speaker in English and German and therefore responsible for the back-translation of the questionnaire

A market research institution, that will be executing the field work; i.e. programming the questionnaire and provide the questionnaire to the panel participants.

The market research organisation is BILENDI (www.bilendi.co.uk) a leading market research full-service provider that supports with their own panel (meinungsplatz.de). Bilendi adheres to the quality standards defined by the market research industry and is a member of the major European professional associations: AEDEMO, BVM, DGOF, ESOMAR, MRS, SYNTEC, VSMS / ASMS.

3. Details of Peer Review

Peer reviews happen regularly within the supervisory team. Thereby Giampaolo has been reviewing the literature review (chapter 2) as well as the introduction chapter 1. The methodological chapter 3 is being reviewed by Yuksel, who also guided me intensively during the establishment of the questionnaire and target group definition as well as conducting the conceptual model. Marco, as third supervisor, has reviewed all chapters as well, to ensure that they meet the practical and industry-specific requirements. Of course, all chapters have been reviewed one more time with the whole supervisory team individually to ensure their different
feedback is included. Within this peer revisions there were regular skype calls with the supervisors as follows:

With Giampaolo for Chapter 1 & 2 – every 2 weeks during that time
With Yuksel for Chapter 3 – every 2 weeks during that time
With Marco for all chapters – every 8 weeks constantly

Moreover, all major milestones (e.g. conceptual model, questionnaire, finalised chapter 2, etc.) have been share via email so that comments were included.

Besides the peer revision within the supervisory team, I attended the research conference in Portsmouth and have incorporated the feedback from other students. This happened mainly for the following topics:

Research questions & gap
Literature review
Conceptual model
Methodology for the questionnaire

4. Funding Details

This research project is exclusively financed by the researcher himself privately. Hence, there is no influence from external stakeholders who may fund the project. Moreover, there is no financial risk, as the project is already financed through private savings which will cover the project until submission in 2020 including all relevant administrative costs such as travel as well as the costs for the fieldwork.

5. Sites/Locations

The actual dissertation work will take place at the researcher’s home office and at the university in Portsmouth. The fieldwork for data collection will take place online, so that participants can provide their answers in a familiar environment such as their office or home. Moreover, the participants will be able to complete the questionnaire from their mobile device as well, which will increase the response rate. Data analysis and collection will be done by the researcher again and no further input from the interviewees is required.
6. Insurance/indemnity Arrangements

As the data collection as well as the whole research project is rather desk-based and no on-site visits of organisation or other critical sites are required, an extended insurance is not required and the standard insurance of the university is sufficient.

Hence, I can confirm, that this study is a simple desk based piece of research.

7. Aims and Objectives/Hypotheses

7.1 Aims

The aim of the study is to investigate relationship between implementation and usage of CRM systems, and the business performance in large organisations from the German 'Mittelstand' focusing on B2B markets. A survey will be administered to collect quantitative evidence of the correlation to enrich the results with explanations based on the literature review. Thus, the study will ensure external validity so that the findings can be applied to the whole B2B 'Mittelstand' sector. Also, managerial implications are provided so that practitioners are able to use the findings within their organisations resulting in a better business performance.

7.2 Primary Objective

Achieving the above mentioned aims from an academic and practitioner’s perspective, the main research question is defined as follows:

*How does the German ‘Mittelstand’ implement and use CRM to improve their business performance?*

7.3 Secondary Objective(s)

Answering the main research question, specific objectives have been set as follows:

Identify and asses how the German 'Mittelstand' addresses key CRM concepts within their organisations. In specific the CRM strategy, implementation planning, analytics and technology as well as the measurement will be investigated.

Evaluate the impact of those concepts on business performance with regards to internal process efficiency, customer satisfaction and financial performance.
Develop a research instrument to investigate the relationship between CRM implementations and business performance

8. Study Summary

8.1 Justification/Summary of Study (no more than one side)

Researching in the intersection between information technology and the traditional marketing and sales function has become increasingly important from a practitioner and an academia perspective. From a macro-economic practitioner perspective, Satya Nadella highlights how important information technology has become for every business. The impact of new technologies is the biggest risk and at the same time a huge opportunity for any organisation to realise competitive advantages. Hereby organisations must fulfil customer demands, which are increasingly influenced by IT (Leußer, Rühl, & Wilde, 2011).

Within the organisation, marketing and sales represent the direct communication to customers, where it is vital to meet those customer needs (Guenzi & Troilo, 2006). Besides the changing customer needs from the service perspective, new technologies influence and change whole product concepts from isolated products to integrated solutions. Consequently, organisations will need to invest more resources into their services. This will increase revenues from service while at the same time revenues from product production will be at least under high pressure. Overall, it can be summarised that markets change from production oriented markets to service oriented markets driven by digitalisation. Thus, organisations need to become more customer oriented and assign their resources to profitable and high-potential customers.

The above-mentioned challenges appear to be even more mentionable when talking about the German ‘Mittelstand’ in B2B markets. This is mainly due to the underdeveloped IT infrastructure in Germany which makes it difficult for organisations to deploy modern IT-based services. In addition, the German ‘Mittelstand’ has achieved success mostly through innovative products and IT-based customer orientation was seldom first priority in any firm strategy (Wolf & Zipse, 2009). Customers are more informed and tend to purchase independently without interacting with marketing and sales department (Nigel, 2014) which makes it more difficult to highlight the benefits of products. Thus, organisations must react to achieve higher customer satisfaction with similar resource input. In order to do so, CRM and analysis practices are key pillars for solid business performance.

From an academia perspective there is an extensive amount of literature about CRM and how it is related to Return on Investment (ROI) (Agrawal & Johnson, 2003; Gummesson & Gunmesson,
2004; Shin, 2004), CRM implementation plans (Kozák, 2007; Sharapa, 2009), incorporating CRM into e-business strategy (Horn, Salvendy, & Feinberg, 2005; Lee, 2005; Ragins & Greco, 2003; Zeng, Yen, & Joseph Wen, 2003). At the same time a large number of studies exists about business and customer analytics (Handzic, Durmic, & Ozlen, 2014; Maric & Basic, 2012; Shahraki, Dejkam, & Dezhkam, 2015; Stein, Smith, & Lancioni, 2013). However, so far there are only limited contributions that combine these two elements. Within the CRM theory a distinction between operational, collaborative and analytical CRM is well established whereby the analytical part of CRM aims to investigate analysis approaches within CRM systems. Even though increasing attention was spent on those analytical CRM topics in recent years, scholars seldom focused specifically on MSEs nor did they consider newest technology from CRM or analytical perspective. Moreover, scholars have not discussed the impact of analytical CRM on business performance in detail. Only a few studies are aiming at the B2B industry either from a CRM or an analytics standpoint but the generated findings are mostly derived from case studies, which makes them less meaningful for a whole sector. Other studies investigate the analytical parts of CRM in B2B markets but discuss them rather from a technical or respectively mathematical perspective. Thus, the practical relevance was rather low and marketers struggle to use the findings, especially because no clear managerial recommendations are given. As the ‘Mittelstand’ sector is predominantly strong in Germany, there is a significant importance for the whole economy, to focus on these organisations also from a theoretical perspective.

### 8.2 Anticipated Ethical Issues

Based on Saunders ethical issues associated with internet-mediated research the following issues have been identified and will be addressed as follows:

<table>
<thead>
<tr>
<th>Ethical Issue</th>
<th>Prob. of occurrence</th>
<th>Measures to address the risk</th>
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<tbody>
<tr>
<td>Answers are not representative through <strong>Scope for deception</strong> where participants just click-through the questionnaire</td>
<td>Medium</td>
<td>A professional panel provider will be used and no online forums etc. will be included. The LOI will be measured, so that responses which are unrealistically fast (compared to pilot) can be excluded.</td>
</tr>
<tr>
<td><strong>Harvesting data</strong> can become an issue as the data would not be trustful anymore.</td>
<td>Low</td>
<td>A professional panel provider will be used, where all participants are registered for and accept the usage of their data.</td>
</tr>
<tr>
<td><strong>Respecting privacy</strong> of the responses and ensure <strong>Confidentiality of data and participants</strong></td>
<td>Low</td>
<td>The answers will be 100% anonymised so that no conclusion can be made on who provided the answer. Also, no demographic data will be generated but only professional data (e.g. job role) and organisational data (e.g. number of employees)</td>
</tr>
</tbody>
</table>
Data (i.e. raw data of the respondents) will not be handed over to third party institutions.

Ensure **Informed consent** for the interviewees

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Likelihood</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ensure Informed consent for the interviewees</strong></td>
<td>Low</td>
<td>A detailed introduction of the survey will be given, so that the participants are clearly informed about the scope, intention and further analysis of this questionnaire. After the introduction the interviewee can agree or disagree participating the questionnaire.</td>
</tr>
<tr>
<td><strong>Management and analysis of data as well as reporting of findings</strong></td>
<td>Medium</td>
<td>Data will be analysed only by the researcher himself. The panel provider does not have any insights about the conceptual model or the details about the study. The findings will be generalised, so that no conclusion can be drawn on the organisations or individuals that have participated. No personal data will be gathered in terms of GDPR. The interviewees from the panel can participate 100% anonymously.</td>
</tr>
</tbody>
</table>

### 8.3 Anticipated other *Risks or Concerns*

**Risks to participants:** The risk to participants is very low, as they will conduct an online survey and they do not have to leave their office or home. If they participant via a mobile phone, they can do this along the way, but no travelling or other risk-causing activity is required. Psychologically, the risk is very low as well, because the survey will be finished within 10-15 minutes and does not include question items that are psychologically threaten to the participant.

**Risks to researchers/university staff/students:** The researcher himself has two minor risks. First, he needs to ensure that the professional career and the DBA study are aligned without harming business or research. Second, the regular travel risks must be managed, as travelling activities are necessary for peer reviews, etc.

**Reputational risks:** There is a reputation risk for the university, as the researcher acts as student of UoP. However, the risk will be minimised through the peer reviews and the guidance of the supervisory team. There is also a reputation risk for the researcher as he is working in the field of study (CRM). In both cases, the risk will become only relevant if the findings will be published in academic journals as well as in practitioner journals. Hence the publication will be post-poned until the research has been defended within the vigour at the end of the DBA programme. This will minimise the reputation risk for the researcher and the university.

**Data security risk:** Small amounts of operational ‘working data’ is being stored online in a Microsoft One-Drive Cloud. The majority and all versioning data will be stored on a UoP Google Drive. Moreover, regular back-ups are being made to ensure that the data is also available offline. These back-ups will be stored on the personal computer of the researcher during the research project. Afterwards, i.e. as soon as the dissertation is finalised, these back-ups...
will be transferred to the UoP Google Drive and all other files will be deleted from the researchers PC.

### 8.4 Medical Cover (if applicable)

Medical cover is not applicable, following the UoP guidelines.

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**9. Description of Method/ Protocol**

The data gathering method will be an online survey.

Based on the literature review, a conceptual framework was developed that measures the impact of CRM on business performance (BP) and thereby aims to answer the main research question.

**High-level conceptual framework:**

![Diagram of High-level conceptual framework]

To measure this main association between CRM and BP several concepts will be introduced. Therefore, the online survey is separated in three sections. Section 1 includes all necessary questions to cluster data later on and will support the data analysis. These questions aim on an organisation level and on an individual level. Section 2 investigates the degree of CRM implementation along five categories. The categories are:

- CRM Strategy
- CRM Implementation Planning
- aCRM technologies & applications
- CRM measurement

Lastly, section 3 covers the measurement of business performance and thereby investigates the areas of internal process efficiency, external customer satisfaction and financial performance.

The figure below illustrates how the concepts interact with each other and therefore build the detailed conceptual framework for the actual questionnaire:

**Detailed conceptual framework:**
Based on this model, the hypotheses were developed to measure the impact from CRM on BP. To do so, four hypotheses were defined:

H1: CRM Strategy positively affects business performance
H2: CRM Implementation planning positively affects business performance
H3: aCRM technologies and applications positively affect business performance
H4: CRM measurement positively affects business performance

For all four hypotheses, business performance can be separated into the three dimensions, which were introduced within the conceptual framework above. A positive correlation is being expected for all hypotheses so that the hypotheses model can be illustrated as follows:

Hypotheses model
After developing the conceptual framework and the hypotheses, these concepts were introduced to the SPSS Amos software and the structural equation model (SEM) was tested as illustrated below:

SEM – Test

At that stage, the question items were still in evaluation so the illustration above does not reflect the latest status with the finalised question items. However, as the questionnaire is now finalised, the SEM-Test can be used as basis for the final SEM with the correct question items for the 4 CRM concepts and the 3 BP concepts.

Having established the conceptual framework and having tested the SEM approach, the next step was to define and review the questionnaire with its question items. Thereby several items have been defined, mainly from the literature review, as every concept of CRM and BP reflects a chapter in the literature review. This resulted in a questionnaire with 87 items, which was too long for the final status. However, this extended version of the questionnaire was piloted with 10 possible participants from the authors personal network. The feedback of this pilot (which did not generate any data but only served the purpose of reflecting their understanding of the question items) phase was incorporated and the questionnaire was shortened to only 52 question items. In detail 9 items were associated with the introduction, i.e. to structure data later on and 26 items were associated with the CRM concepts while 17 items were associated with the BP items. Thereby, all questions were eliminated, which raised questions within the pilot group that represented the final population. In
other words, only questions that have been piloted successfully are included in the final questionnaire.

Besides the comprehensibility of the question items, the scaling was challenged as well. As a result, the CRM concepts will be measured with a 7-point scale asking for the level of (dis)agreement for specific statements.

For the BP concepts, a 11-point scale was chosen and all question items were set in comparison to the nearest competitors. By using this wording, all participants can estimate how their organisation performs without knowing the exact figures which would be a secondary analysis. Moreover, the 11-point scale ensures, that the selection ‘about the same’ (5) is also statistically in the middle of the scale, which it would not be within a 10-point scale.

After having finalised the questionnaire, a revision from the supervisory-team has led to another 5 questions for section one to allow better structuring and more detailed analysis later. So finally, the questionnaire resulted in 58 question items. This final status can be seen in the appendix and was piloted one more time in excel-format and with a non-CRM person to measure the needed time to respond to all questions. Thereby a length of interviewee (LOI) was measured with 10 minutes. At the same time, the population was analysed and the target group was defined – see section 11.

10. Compliance with Laws, Codes, Guidance, Policies and Procedures

To ensure that ethical issues will be minimised and that a standard procedure will be followed during the whole research, this study will follow the code of practice for research from the UK RIO Code of Practice. Hence the author will follow these guideline as well as the guidelines from the University of Portsmouth. Regarding GDPR, the author will also ensure, that now personal data will be saved as the questionnaire results will be 100% anonymised (See section 8.2).

http://ukrio.org/publications/code-of-practice-for-research/

11. Recruitment of Participants

11.1 Who are the Research/ Participant Population?
The German ‘Mittelstand’ sector includes 98% of all organisation and can be compared with the European Union’s definition of SME organisations. However, this research focuses on large organisations within the German ‘Mittelstand’ and therefore targets at 15,061 organisations. This population does include big corporates which are not defined as German ‘Mittelstand’. Hence, the below described exclusion criteria will remove these large corporates (e.g. Volkswagen, Siemens, etc.) by defining a threshold according to employees. At this stage the whole population is defined with all organisations with more than 250 employees which results in the 15,061 organisations (Source: https://de.statista.com/statistik/daten/studie/1929/umfrage/unternehmen-nach-beschaeftigtengroessenklassen/)

11.2 Inclusion/Exclusion Criteria

Defining the sample for the survey, the following inclusion and exclusion criteria will be used:

**Inclusion Criteria:**

Employees from German B2B medium sized organisation that have between 250 and 10,000 employees.

All participants should have a relation to CRM; i.e. they have at least one year CRM experience (no matter in what role: project leader, user, consultant, etc.).

**Exclusion Criteria:**

Organisations with less than 250 or more than 10,000 employees

Participants without any experience in CRM

Participants from the B2C sector

Participants from organisations outside of Germany

The panel providers will ensure, that the responses are from B2B organisations in Germany. Moreover, the introduction questions will identify the CRM experience and the organisational key facts like number of employees.

11.3 Number of participants (include rationale for sample size)

Based on the organisational definition from 11.1 the whole population includes 15,061 organisations. Unfortunately, there is no statistic about the number of organisations with more than 10,000 employees and this population includes organisations with more than 10,000 employees. So, for the statistical probability it is assumed that the population will be 15,061. However, the responses from organisation with more than 10,000 employees will not be considered within the data gathering (exclusion criteria). It is assumed that only a few hundred
(maximum 1000) have more than 10,000 employees. Using this assumption, the estimated population would be 14,061 organisations. With the help of Saunders (2009) 95% confidence level table for statistical probability sampling the number of needed participants is 378 organisations (for a population size of max. 25,000). Hence it is irrelevant matter if the population is 14,061 or 15,061 as the next lower population size is 10,000 organisations and the next higher is 50,000

11.4 Recruitment Strategy (including details of any anticipated use of a gatekeeper in host organizations to arrange/distribute participant invitations)

The recruitment strategy will focus on the selection of an adequate panel provider with relevant access to B2B organisations from the German 'Mittelstand'. After a first screen of possible panel providers, they were asked to provide a quotation for the programming of the questionnaire and the complete field work, so that they provide the raw-data as SPSS tables. Based on this a partner has been selected.

11.5 Payments, rewards, reimbursements or compensation to participants
Incentives are included in the quotation from the panel provider and they will issue the incentives to the participants. The panel provider will pay an incentive, if the participant completes the survey. An additional price is not available.

### 11.6 What is the process for gaining consent from participants?

A formal consent will be included in the survey. This consent will include an introduction of the survey, which gives an introduction of the study and explains which concepts of CRM and BP will be included. As the participants are registered for a specialised panel, which the author will use, there shouldn’t be any risk of consent. However, after the introduction the participants have to formally confirm, that they have understood the purpose of this study and confirm that their answers can be used for further analysis. Thereby, the four key statements from the consent form from the university will be applied as follows:

- I confirm that I have read and understood the information for the above study. Moreover, I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason.
- I understand that data collected during this study will be processed in accordance with data protection law.
- I agree to take part in the above study.

The introduction letter incl. the consent form is attached to this application. The introduction letter will be included within the survey, so that they are informed about the purpose of the study. The consent form will be included within the survey and systematically tracked, so that the participants confirm that they understood and agree to the purpose, scope and intension of the study and that they are willing to take part in it; i.e. fill out the questionnaire.

This means, that they have consented as soon as they start the survey, because they agree to the content of the consent form by clicking "Start" within the online survey. The panel provider will then be able to keep track on their confirmation for consent.

### 11.7 Has or will consent be gained from other organisations involved (if applicable)?

No other consent is needed, as an official panel will be used.

### 11.8 Arrangements for translation of any documentation into another language (if applicable)?

As the development of the survey has been made in English but the participants will be German native speaker, the questionnaire is going to be available in English and German language so that the participants can choose the language they prefer. For the back-translation a native-speaker in
English and German will test and adjust the wording of both questionnaires. This person (Alexander Koestner – Geze GmbH) was raised bi-lingual growing up in South-Africa and Germany and is a possible respondent himself as he is working in the German ‘Mittelstand’ and has CRM experience.

11.9 Outline how participants can withdraw consent (if applicable), and how data collected up to this point will be handled. Also stop criteria for specific tests (if applicable)?

The participants will be asked to confirm the in 11.6 mentioned points after reading the introduction. At this point in time, they will not have entered any personal data. If they accept to take part in the study, they will be asked to provide their answers afterwards.

11.10 Outline details of re-consent or debrief (if applicable)?

The participants will have the possibility to quit the survey at any time, mentioning that their entered data should be deleted. This data will not be used within the analysis stage as the panel provider will exclude the data and ensure that it will be deleted.

12. Data Management

12.1 Description of data analysis

The gathered data will be analysed within a structural equation modelling approach. Thereby each of the concepts of CRM and BP will be measured individually to proof, whether the chosen question items provide fit in the data so that they are reliable as measuring instrument. As a result, the collection of measuring items for each of the concepts will provide a research instrument (see research objective #3).

Besides the development of the research instrument, the CRM concepts will result in an assessment of CRM usage for the German ‘Mittelstand’ sector. Hence, a statement can be made on how these organizations have deployed a CRM Strategy, how they have planned their implementation, how they user analytical technologies and application within CRM and how the measure their CRM success. These results can then be classified according to company size, etc. as these data is being available from the introduction part (see research objective #1).

With these two results, an analysis will be made using SEM to give insights about the multi-facet constructs that are being measured, because the CRM concepts can have different effects on the
business performance side. Moreover, the SEM includes the indirect (mediated) affects between the concepts.

12.2 Where and how will data be stored DURING the project?

As there is no personal data, which will be gathered GDPR is not relevant to this study because all data is 100% anonymized.

Small amounts of operational ‘working data’ is being stored online in a Microsoft One-Drive Cloud. The majority and all versioning data will be stored on a UoP Google Drive. Moreover, regular back-ups are being made to ensure that the data is also available offline. During the field work, the panel provider stores data as well but will comply with data protection regulations as the participants have agreed to their consent forms when registering for the panel.

12.3 Destruction, Retention and Reuse of Data (often AFTER your project has finished)

Sharing and making research data open access / Do I have to share my research data?

The research data will be anonymized and made available, as there are no restrictions which would not allow to share the data and make ‘open research’ available.

The research data including all findings of the research, the complete dissertation itself and all necessary appendices and raw-data including consent forms etc. All this data will be retained for a minimum of 10 years in accordance with the UoP Retention Schedule for Research Data. Paper records may be scanned and originals destroyed. Data will further be saved in anonymous form. It is stated, that the doctoral work of the author will be published and data – anonymously – can be reused by other authors.

Sharing personal data

Not applicable. See 12.2

Destruction

After the 10-years of data storage, the data will be destructed if required. This will depend on further research from the author or other scholars.

12.4 Personal Data – How will confidentiality be ensured?
Not applicable, see 12.2

<table>
<thead>
<tr>
<th>12.5 How will data belonging to organisations (publicly unavailable data) be handled (if applicable)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisational data will be gathered in terms of questionnaire feedback from individuals who represent the organisation. However, these insights are subjectively gathered, as the opinion of the individuals is being asked. For this reason, the confidentiality of the data is limited. However, all data will be anonymised also from an organisational perspective, which means that no organisational names will be gathered so a conclusion to what organisation this response belongs to will be nearly impossible. With regards to organisational data, the following question items will be asked to analyse the data:</td>
</tr>
<tr>
<td>Approx. number of employees</td>
</tr>
<tr>
<td>Approx. turnover p.a.</td>
</tr>
<tr>
<td>Location (City) of the headquarter</td>
</tr>
<tr>
<td>Year of foundation</td>
</tr>
<tr>
<td>Main industry the organisation is operating in</td>
</tr>
<tr>
<td>IF the organisation is family-owned</td>
</tr>
<tr>
<td>Years of CRM usage within the organisation</td>
</tr>
<tr>
<td>Approx. number of CRM users</td>
</tr>
<tr>
<td>Name of the CRM system</td>
</tr>
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<tr>
<th>12.6 How will security sensitive data be handled (if applicable)?</th>
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</thead>
<tbody>
<tr>
<td>There is no security sensitive data in the field of CRM research as customer and personal data is not being gathered.</td>
</tr>
</tbody>
</table>
13. Publication / Impact / Dissemination Plans

In regards to publication, there are two possibilities. First, after the project has ended and the dissertation has been defended (vigour) a summary of the findings may be published in an academic and in a practitioner journal to underline the contribution to practice and theory.

Second, there might be organisations that are interested in publishing the results and use them as door-opener for consulting services. If that will be the case, the author will write an article about the findings but does not provide the complete data to them.

14. References


15. Appendices

<table>
<thead>
<tr>
<th>Document</th>
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<th>Version No.</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Invitation Letter &amp; Consent Form</td>
<td>2019.03.19</td>
<td>3</td>
</tr>
<tr>
<td>Participant Information Sheet(s) (list if necessary)</td>
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<td>-</td>
</tr>
<tr>
<td>Consent Form(s) (list if necessary)</td>
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<td>Peer / Independent Review</td>
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<td>Supervisor Email Confirming Application</td>
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<td>Evidence From External Organisation Showing Support</td>
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<td>Terms of Reference for Steering / Advisory Group</td>
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<tr>
<td>Survey Instrument</td>
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<td>-</td>
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<tr>
<td>Interview Questions / Topic List</td>
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</table>
16. Declaration by Principal Investigator and Supervisor (if applicable)

1. The information in this form is accurate to the best of my/our knowledge and belief and I/we take full responsibility for it.
2. I/we undertake to conduct the research/ work in compliance with the University of Portsmouth Ethics Policy, UUK Concordat to Support Research Integrity, the UKRIO Code of Practice and any other guidance I/we have referred to in this application.
3. If the research/ work is given a favourable opinion I/we undertake to adhere to the study protocol, the terms of the full application as finally reviewed and any conditions set out by the Ethics Committee in giving its favourable opinion.
4. I/we undertake to notify the Ethics Committee of substantial amendments to the protocol or the terms of the final application, and to seek a favourable opinion before implementing the amendment.
5. I/we undertake to submit annual progress reports (if the study is of more than a year’s duration) setting out the progress of the research/ work, as required by the Ethics Committee.
6. I/we undertake to inform the Ethics Committee when the study is complete and provide a declaration accordingly.
7. I/we am/are aware of my/our responsibility to be up to date and comply with the requirements of the law and relevant guidelines relating to security and confidentiality of personal data, including the need to register, when necessary, with the appropriate Data Protection Officer. I/we understand that I/we am/are not permitted to disclose identifiable data to third parties unless the disclosure has the consent of the data subject.
8. I/we undertake to comply with the University of Portsmouth Data Management Policy.
9. I/we understand that records/data may be subject to inspection by internal and external bodies for audit purposes if required.
10. I/we understand that any personal data in this application will be held by the Ethics Committee, its Administrator and its operational managers and that this will be managed according to the principles established in the Data Protection Act 1998 (and after May 2018, the General Data Protection Regulation).

11. I understand that the information contained in this application, any supporting documentation and all correspondence with the Ethics Committee and its Administrator relating to the application:

Will be held by the Ethics Committee until at least 10 years after the end of the study

Will be subject to the provisions of the Freedom of Information Acts and may be disclosed in response to requests made under the Acts except where statutory exemptions apply.

May be sent by email or other electronic distribution to Ethics Committee members.

I/we understand that the favourable opinion of an ethics committee does not grant permission or approval to undertake the research/work. Management permission or approval must be obtained from any host organisation, including the University of Portsmouth or supervisor, prior to the start of the study.

Principal Investigator: Manuel Kern
Date: 2018/03/19

Supervisor (if applicable): Giampaolo Viglia
Date: 2018/03/19
Appendix 8: Invitation letter and consent form

Consent form

Munich, March 2019

Dear participant,

This study focuses on the relation between Customer Relationship Management (CRM) and Business Performance (BP) within the B2B German ‘Mittelstand’ sector.

The questionnaire starts with questions regarding your professional and organisational facts. Within CRM sections you are asked to give your personal opinion whether you agree or disagree to a given statement within the sub-concepts. Within BP sections you are asked to compare the performance of your organisation with the nearest competitors. There is no need to know exactly about the performance, because your subjective assessment and comparison is being asked.

Please read the following Consent form carefully and confirm, that you have read and understood these information before starting the survey.

The marketing and sales department of the University of Portsmouth wishes to process your personal answers / data* as part of the study EFFECTS OF CRM IMPLEMENTATION ON LARGE SIZED ENTERPRISES’ BUSINESS PERFORMANCE IN THE GERMAN B2B ‘MITTELSTAND’ SECTOR. If you have any queries about this study please contact Manuel Kern or if you have any general queries about how your data will be processed, please contact the University’s Data Protection Officer at informationmatters@port.ac.uk.

We ask for your consent to process the answers / data* we ask for in the questionnaire. We will not share your personalised data with anyone, but only use your answers as basis for data analysis and provide findings to the research community as well as to practitioners within the industry. We will store your data outside the EU. Your personal answers / data* will be held securely on University servers for 10 years and securely destroyed after that date. The derived findings might be published in relevant journals for scholars and practitioners. You have the right to request a copy of the personal answers / data* we hold about you, to restrict the use of your personal answers / data*, the right to be forgotten, the right to data portability and the right to withdraw your consent to the use of your data.

For more information on these rights, please see the information at the following link: http://www.port.ac.uk/departments/services/corporategovernance/gdpr or contact Manuel Kern (Manuel.Kern@myport.ac.uk). You also have the right to lodge a complaint about the use of your personal answers / data* to initially the University (information-matters@port.ac.uk) then to the UK Information Commissioner’s Office (ICO) – for more information please see https://ico.org.uk/for-the-public/raising-concerns

By starting the survey, you have read this information carefully and agree to the following points:

- I confirm that I have read and understood the information for the above study. Moreover, I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason.
☐ I understand that data collected during this study will be processed in accordance with data protection law.

☐ I agree to take part in the above study.

Thank you very much for your participation!

Manuel Kern (Manuel.Kern@myport.ac.uk)
### Teil 1 – Einleitung

#### Frage

Bitte geben Sie die Gesamtmitarbeiterzahl Ihres Unternehmens an

**Antwortmöglichkeiten als einfache Auswahl:**

- unter 10 Mitarbeiter
- 10 bis 49 Mitarbeiter
- 50 bis 99 Mitarbeiter
- 100 bis 249 Mitarbeiter
- 250 - 499 Mitarbeiter
- 500 – 1.000 Mitarbeiter
- 1.000 – 2.499 Mitarbeiter
- 2.500 – 4.999 Mitarbeiter
- 5.000 – 7.499 Mitarbeiter
- 7.500 – 9.999 Mitarbeiter
- 10.000 – 49.999 Mitarbeiter
- 50.000 – 99.999 Mitarbeiter
- über 100.000 Mitarbeiter

**Programmierhinweis:**

Wenn Mitarbeiteranzahl kleiner als 250 (markiert in rot) oder größer als 10.000 (markiert in orange) \(\rightarrow\) Ausschlusskriterium / Ende der Befragung

Bitte geben Sie Ihre CRM Erfahrung (in Jahren) an

**Antwortmöglichkeiten als einfache Auswahl:**

- unter 1 Jahr
- 1 - 3 Jahre
- 4 - 6 Jahre
- 7 - 10 Jahre
- 10 - 14 Jahre
- 15 - 25 Jahre
- über 25 Jahre

**Programmierhinweis:**

Wenn Erfahrung kleiner als 1 Jahr (markiert in rot) \(\rightarrow\) Ausschlusskriterium / Ende der Befragung

Agiert Ihr Unternehmen hauptsächlich innerhalb eines Business-to-Business (B2B) Umfelds?

*(B2B bezeichnet Geschäftsbeziehungen zwischen Unternehmen)*

**Antwortmöglichkeiten als einfache Auswahl:**

- Ja
- Nein
- Weiß ich nicht

**Programmierhinweis:**
Wenn Unternehmen nicht im B2B Umfeld, d.h. Antwort = nein oder weiß ich nicht (markiert in rot) → Ausschlusskriterium / Ende der Befragung

Bitte geben Sie den jährlichen Gesamtumsatz Ihres Unternehmens an

Antwort:

4.) Freitexteingabe; nur Zahlen und max. 12 Zeichen
   • Endung = Euro

In welcher Stadt befindet sich der Hauptsitz Ihres Unternehmens?

Antwort:

5.) Freitexteingabe max. 100 Zeichen

Wann wurde das Unternehmen, für das Sie arbeiten, gegründet?

Antwort:

6.) Freitexteingabe; nur Zahlen und max. 4 Zeichen
   • Endung = Jahr

Bitte wählen Sie die Industrie aus, in welcher Ihr Unternehmen hauptsächlich agiert

Antwortmöglichkeiten als einfache Auswahl:

- Automobilindustrie
- Automobilwirtschaft (Handel und Reparatur)
- Baugewerbe
- Bekleidungs- und Lederindustrie
- Chemische Industrie
- E-Commerce
- Detailhandel
- Energiewirtschaft, Versorgung
- Ernährungsgewerbe
- Erziehung, Bildung, Unterricht
- Finanzwirtschaft (Banken)
- Finanzwirtschaft (Versicherungen)
- Freizeit-, Kultur- und Sportaktivitäten
- Gastgewerbe
- Gesundheitswesen
- Großhandel
- Herstellung von Brenn- und Treibstoffen
- Herstellung von Büromaschinen, Datenverarbeitungsgeräten, Elektronik
- Herstellung von elektrischen und elektronischen Bauelementen
- Holz und Papierindustrie
- Immobilienwirtschaft, Grundstücks- und Wohnungswesen, Vermietung
- Industrielle Verarbeitung von Mineralien
- IT-Dienstleistungen
- Kunst, Literatur, Musik
- Land- und Forstwirtschaft, Fischerei, Fischzucht
- Markt- und Meinungsforschung
- Maschinenbau
- Medienwirtschaft
- Metallerzeugung und -bearbeitung, Herstellung von Metallerzeugen
- Nichtregierungsorganisation/Verbände (nicht gewinnorientiert)
- Öffentliche Verwaltung
- Verlags- und Druckgewerbe
- Personenbeförderung
- Pharma, Parfüm und Pflegeprodukte
- Polizei/Feuerwehr/Rettungshelfer
- Produktion von Haushaltsgeräten
- Produktion/Verarbeitung sonstiger Konsumgüter
- Produktion/Verarbeitung sonstiger Produktionsgüter
- Rechtspflege
- Schiff-, Flugzeug-, Eisenbahnbau
- Sonstige Dienstleistungen
- Sozialarbeit/Sozialpädagogik
- Tabakverarbeitung
- Telekommunikation
- Textilindustrie
- Tourismus (Außer Gastgewerbe)
- Unternehmens-, Rechts-, Personal- und Steuerberatung
- Verteidigung/Militär
- Warentransport/Logistik
- Werbung, Kommunikation, Marketing, PR
- Wissenschaft (Forschung, Universität etc.)
- Sonstige

Programmierhinweis:
Wenn „Sonstige“ (markiert in rot) dann Freitexteingabe (max. 100 Zeichen)

Ist das Unternehmen, für das Sie arbeiten, in Familienbesitz?
Antwortmöglichkeiten als einfache Auswahl:
• Ja
• Nein
• Weiß ich nicht

Seit wie vielen Jahren nutzt Ihr Unternehmen CRM?
Antwort:
• Freitexteingabe; nur Zahlen und max. 2 Zeichen
• Endung = Jahr(e)

Wie viele Mitarbeiter nutzen Ihr CRM System aktiv (ungefähr)?
Antwort:
• Freitexteingabe; nur Zahlen und max. 5 Zeichen
• Endung = Mitarbeiter

Welches CRM System nutzen Sie in Ihrem Unternehmen (z.B. Salesforce, Microsoft Dynamics, SAP)?
Antwort:
• Freitexteingabe; max. 200 Zeichen

Bitte wählen Sie die Abteilung, in welcher Sie arbeiten.
Antwortmöglichkeiten als einfache Auswahl:
• Einkauf
• Office Management/Sekretariat/Verwaltung
• Vertrieb, Verkauf
<table>
<thead>
<tr>
<th>Position im Unternehmen</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Allgemeine Geschäftsleitung</td>
</tr>
<tr>
<td>• Buchhaltung, Finanzwesen</td>
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<tr>
<td>• IT</td>
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<tr>
<td>• Marketing, Werbung, Kommunikation</td>
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<tr>
<td>• Herstellung/Fertigung</td>
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<td>• Personal</td>
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<tr>
<td>• Logistik</td>
</tr>
<tr>
<td>• Controlling</td>
</tr>
<tr>
<td>• Innovationsmanagement</td>
</tr>
<tr>
<td>• Weiterbildung, Schulung</td>
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<tr>
<td>• Forschung und Entwicklung</td>
</tr>
<tr>
<td>• Recht</td>
</tr>
<tr>
<td>• Unternehmensentwicklung</td>
</tr>
<tr>
<td>• Marktforschung</td>
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<tr>
<td>• Kundenbeziehungsmanagement</td>
</tr>
<tr>
<td>• Telekommunikation</td>
</tr>
<tr>
<td>• Risk Assessment</td>
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<td>• Sonstige</td>
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</table>

**Programmierhinweis:**
Wenn „Sonstige“ (markiert in rot) dann Freitexteingabe (max. 100 Zeichen)

**Bitte wählen Sie Ihre Position im Unternehmen**

**Antwortmöglichkeiten als einfache Auswahl:**
- • Inhaber, Gesellschafter
- • Geschäftsführer
- • Senior Management (z. B. erweiterte Geschäftsleitung, Direktor)
- • Middle Management (z. B. Abteilungsleitung)
- • Angestellter mit Leitungsfunktion
- • Angestellter ohne Leitungsfunktion
- • Facharbeiter mit abgelegter Prüfung
- • Arbeiter/Vorarbeiter
- • Auszubildender
- • Praktikant
- • Freiberuflich
- • Selbständig
- • Sonstige

**Programmierhinweis:**
Wenn „Sonstige“ (markiert in rot) dann Freitexteingabe (max. 100 Zeichen)

**Bitte nennen Sie Ihre Funktion im Unternehmen (z.B. Vertriebsinnendienst, Social Media Experte, etc.)**

**Antwort:**

13.) Freitexteingabe; max. 200 Zeichen

**Wie lange arbeiten Sie bereits in dieser Funktion?**
- Freitexteingabe; nur Zahlen und max. 2 Zeichen

15.) Endung = Jahr(e)
Teil 2 – Kundenbeziehungsmanagement / CRM

Die Antwortmöglichkeiten können als Einfachauswahl (Checkbox) ausgewählt werden und wie folgt von links nach rechts auswählbar sein:

☐ Stimme vollständig nicht zu
☐ Stimme größtenteils nicht zu
☐ Stimme teilweise nicht zu
☐ Weder noch / Teils teils
☐ Stimme teilweise zu
☐ Stimme größtenteils zu
☐ Stimme vollständig zu

Kundenbeziehungsmanagement / Customer Relationship Management (CRM)

| A.) Die folgenden Fragen zielen auf die strategische Ausrichtung Ihres Kundenbeziehungsmanagements (CRM) ab: |
|CRM Strategie kann dabei als firmenweite Initiative verstanden werden, welche den Kunden in den Mittelpunkt aller Unternehmensaktivitäten stellt und dabei in die übergeordnete Firmenstrategie eingebettet ist.|
| 1.) Unsere CRM Strategie berücksichtigt verschiedene Kundengruppen |
| 2.) Unsere CRM Strategie berücksichtigt verschiedene Vertriebskanäle (d.h. berücksichtigt direkte, indirekte, online und andere Vertriebskanäle) |
| 3.) Unsere CRM Strategie berücksichtigt neueste Informationstechnologien (e.g. 5G Bandbreite, Software as a Service, Mobility, etc.) |
| 4.) Unsere CRM Strategie bezieht Kundenfeedback mit ein (z.B. aus Kundenumfragen) |
| 5.) Unsere CRM Strategie ist von der übergeordneten Firmenstrategie und -Vision abgeleitet |

| B.) Die folgenden Fragen zielen auf die Planung und Einführung Ihres CRM Systems ab: |
| 1.) Unsere CRM Systemeinführung folgte einem klaren Prozess zur Anforderungsaufnahme |
| 2.) Unsere CRM Systemeinführung entwickelte ein systematisches Trainingsprogramm |
| 3.) Unsere CRM Systemeinführung enthielt ein dediziertes Change Management |
| 4.) Unsere CRM Systemeinführung wurde entlang eines Kommunikationsplans klar kommuniziert z.B. Newsletter über den Projektablauf, Kommunikation der Rollen, Verantwortlichkeiten und Meilensteine, Eskalationsprozesse, etc. |
| 5.) Unsere CRM Systemeinführung erkannte ein dediziertes Projektmanagement |

| C.1.) Die folgenden Fragen zielen auf die Einsatz von analytischen Technologien innerhalb Ihres CRM Systems ab: |
| 1.) Unser CRM System nutzt Clustering (~ etwas in vordefinierte Gruppen einsortieren) als analytische Technologie z.B. Kunden in Kundengruppen, wie Handelskunden oder Endkunden einsortieren. |
| 2.) Unser CRM System nutzt Klassifikationen (~ Gruppen anhand von vorhandenen Daten bilden) als analytische Technologie |
z.B. A, B, C Kundengruppen anhand des Jahresumsatzes bilden.

3.) Unser CRM System nutzt Vorhersagen als analytische Technologie  
    z.B. Umsatzprognose bis zum Jahresende
4.) Unser CRM System nutzt Datenvorhersagen als analytische Technologie  
    z.B. Trendlinien für Umsatzprognosen, Verkaufstrichter, etc.
5.) Unser CRM System nutzt Predictive Analytics als analytische Technologie  
    z.B. Abwanderungsrate vorhersagen oder 'next-best-Offer' identifizieren

C.2.) Die folgenden Fragen zielen auf die Nutzung von Analysen innerhalb Ihres CRM Systems ab:
1.) Unser CRM System analysiert Umsatzerlöse
2.) Unser CRM System analysiert Marketingkampagnen
3.) Unser CRM System analysiert Kundenaktivitäten (z.B. Kundenbesuche oder Beschwerden)
4.) Unser CRM System analysiert Kundenloyalität
5.) Unser CRM System analysiert Cross- und Up-Selling (Mehrverkauf)
6.) Unser CRM System analysiert Gründe für Kundenbeschwerden

D.) Die folgenden Fragen zielen auf die Erfolgsmessung Ihrer CRM Strategie ab (d.h. auf den Erfolg Ihres Kundenbeziehungsmanagements):
1.) Unsere CRM Strategie misst einmalige Kosten für die Systemeinführung  
    z.B. Training, IT Entwicklung / Programmierung, Change Management
2.) Unsere CRM Strategie misst laufende Betriebskosten  
    z.B. Lizenzen, Cloud Datenverbrauch, etc.
3.) Unsere CRM Strategie misst interne Verbesserungen  
    z.B. Reduktion von Prozessdurchlaufzeiten
4.) Unsere CRM Strategie misst externe Verbesserungen  
    z.B. Erhöhung der Kundenzufriedenheit
5.) Unsere CRM Strategie misst finanzielle Verbesserungen  
    z.B. Erhöhung des Umsatzerlöses

Teil 3 – Unternehmensleistung

Die Antwortmöglichkeiten können als Schieberegler ausgewählt werden und in 11 Ausprägungen wie folgt von links nach rechts auswählbar sein:

- 0 – viel schlechter
- 1
- 2
- 3
- 4
- 5 – ungefähr gleich
- 6
- 7
- 8
- 9
- 10 – viel besser

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Hinweis: Bitte die Fragestellung (E. / F. / G.) bei den zugehörigen Fragen jeweils eingeblendet lassen

### Unternehmensleistung

**E.) Bitte schätzen Sie die Leistung Ihres Unternehmens bezüglich interner Geschäftsprozesse im Vergleich zu der Ihrer engsten Wettbewerber, in den folgenden Bereichen:**

1.) Die Kollaboration zwischen Marketing, Vertrieb und Kundenservice  
   *(Kollaboration ist definiert als gemeinschaftliche Zusammenarbeit an einem Kunden innerhalb der Abteilungen Marketing, Vertrieb und Kundenservice.)*
2.) Die Effektivität der internen Kommunikation
3.) Die Zugänglichkeit von Kundeninformationen  
   *z.B. alle Mitarbeiter wissen wo sie relevante Kundeninformationen finden und können darauf zugreifen*
4.) Die durchschnittliche Durchlaufzeit Ihrer Kundenprozesse in Marketing, Sales und Kundenservice  
   *z.B. Prozesszeit für Angebotserstellung oder Broschüren-Versand*
5.) Die wahrgenommene Mitarbeiterzufriedenheit
6.) Die Komplexität Ihrer Geschäftsprozesse in Marketing, Vertrieb und Kundenservice  
   *d.h. Je mehr Prozessvarianten desto höher die Komplexität und langsamer der Prozesse*

**F.) Bitte schätzen Sie die Leistung Ihres Unternehmens bezüglich Kundenzufriedenheit im Vergleich zu der Ihrer engsten Wettbewerber, in den folgenden Bereichen:**

1.) Der Prozentsatz bzw. Anteil von Kundenumfrageantworten  
   *d.h. 1 von 100 Kunden beantwortet eine Kundenumfrage*
2.) Der Prozentsatz bzw. Anteil von Kundenreferenzen  
   *d.h. 1 von 100 Kunden steht als Referenz zur Verfügung*
3.) Der Prozentsatz bzw. Anteil von positiven Kundenbewertungen  
   *d.h. 1 von 100 Kunden gibt eine positive Bewertung bspw. auf Amazon.com*
4.) Die durchschnittliche Reaktionszeit zu Ihren Kunden  
   *d.h. Wartezeit für Kunden bis zur ersten qualifizierten Antwort*
5.) Der Prozentsatz bzw. Anteil von Kundenbeschwerden  
   *d.h. 1 von 100 Kunden beschwert sich*
6.) Der Prozentsatz bzw. Anteil von loyalen Kunden  
   *d.h. 1 von 100 Kunden kauft Ihre Produkte bzw. Dienstleistungen mehrfach*

**F.) Bitte schätzen Sie die finanzielle Leistung Ihres Unternehmens im Vergleich zu der Ihrer engsten Wettbewerber, in den folgenden Bereichen:**

1.) Die Gesamtkosten Ihrer Kundenprozesse in Marketing, Vertrieb und Service  
   *d.h. alle fixen und variablen Kosten / 'Total Cost of Ownership' für CRM*
2.) Den Umsatz
3.) Die **Konvertierungsrate** von Lead* zum Auftrag
d.h. 1 von 100 Leads wird zum Auftrag.
*ein Lead stellt eine unqualifizierten Kundenkontakt dar (z.B. Visitenkarte auf der Messe)

4.) Den **Umsatznettoerlös**

5.) Den **durchschnittlichen Marktanteil**
### Appendix 10: Model fit indices and CFA of initial model

<table>
<thead>
<tr>
<th>Customer Relationship Management</th>
<th>Mean</th>
<th>SD</th>
<th>Sig. (2-tailed)</th>
<th>Valid Cases / Missing Cases</th>
<th>Test of Normality / KS (Sig.)</th>
<th>α</th>
<th>CR</th>
<th>AVE</th>
<th>(A)</th>
<th>(B)</th>
<th>(C.1)</th>
<th>(C.2)</th>
<th>(D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) CRM Strategy</td>
<td>4.97</td>
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<td>0.61</td>
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<td>(B) CRM Planning and Implementation</td>
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<td>0.78</td>
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<td>0.59</td>
<td>0.59</td>
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<tr>
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<tr>
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<th>Mean</th>
<th>SD</th>
<th>Sig. (2-tailed)</th>
<th>Valid Cases / Missing Cases</th>
<th>Test of Normality / KS (Sig.)</th>
<th>α</th>
<th>CR</th>
<th>AVE</th>
<th>(E)</th>
<th>(F)</th>
<th>(G)</th>
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</thead>
<tbody>
<tr>
<td>(E) Internal business processes</td>
<td>6.85</td>
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<td>100 % / 0%</td>
<td>0.000</td>
<td>0.87</td>
<td>0.60</td>
<td>0.55</td>
<td>-</td>
<td>0.57</td>
<td>0.57</td>
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<tr>
<td>(F) External customer satisfaction</td>
<td>6.82</td>
<td>1.83</td>
<td>0.000</td>
<td>100 % / 0%</td>
<td>0.000</td>
<td>0.87</td>
<td>0.56</td>
<td>0.53</td>
<td>0.76</td>
<td>-</td>
<td>0.62</td>
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<tr>
<td>(G) Financial performance</td>
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<td>1.78</td>
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<td>100 % / 0%</td>
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<td>0.67</td>
<td>0.59</td>
<td>0.76</td>
<td>0.79</td>
<td>-</td>
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<tr>
<th>Model Fit</th>
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<th>BP</th>
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<tr>
<td>Chi-Square (χ²)</td>
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<tr>
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<td>n.a.</td>
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marked in bold = SIC should > 0.8 should > 0.7 should > 0.5 SIC < AVE
### Appendix 11: Model fit indices and CFA of revised model (V1)

#### Customer Relationship Management

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Sig. (2-tailed)</th>
<th>Valid Cases / Missing Cases</th>
<th>Test of Normality / KS (Sig.)</th>
<th>α</th>
<th>CR</th>
<th>AVE</th>
<th>(A)</th>
<th>(B)</th>
<th>(C.1)</th>
<th>(C.2)</th>
<th>(D)</th>
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<tbody>
<tr>
<td>(A) CRM Strategy</td>
<td>4.97</td>
<td>1.69</td>
<td>0.00</td>
<td>100 % / 0%</td>
<td>0.00</td>
<td>0.86</td>
<td>0.81</td>
<td>0.67</td>
<td>-</td>
<td>0.55</td>
<td>0.38</td>
<td>0.43</td>
<td>0.36</td>
</tr>
<tr>
<td>(B) CRM Planning and Implementation</td>
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<td>100 % / 0%</td>
<td>0.00</td>
<td>0.92</td>
<td>0.82</td>
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<td>0.74</td>
<td>-</td>
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<td>0.87</td>
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<td>0.61</td>
<td>0.72</td>
<td>-</td>
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<td>0.55</td>
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<tr>
<td>(C.2) Analytical CRM - Usage</td>
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<td>0.74</td>
<td>0.83</td>
<td>-</td>
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#### Business Performance

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Sig. (2-tailed)</th>
<th>Valid Cases / Missing Cases</th>
<th>Test of Normality / KS (Sig.)</th>
<th>α</th>
<th>CR</th>
<th>AVE</th>
<th>(E)</th>
<th>(F)</th>
<th>(G)</th>
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<tbody>
<tr>
<td>(E) Internal business processes</td>
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<td>0.86</td>
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<td>0.55</td>
<td>-</td>
<td>0.58</td>
<td>0.55</td>
</tr>
<tr>
<td>(F) External customer satisfaction</td>
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<td>0.00</td>
<td>100 % / 0%</td>
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<td>0.87</td>
<td>0.63</td>
<td>0.57</td>
<td>0.76</td>
<td>-</td>
<td>0.61</td>
</tr>
<tr>
<td>(G) Financial performance</td>
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<td>0.00</td>
<td>100 % / 0%</td>
<td>0.00</td>
<td>0.88</td>
<td>0.66</td>
<td>0.58</td>
<td>0.74</td>
<td>0.78</td>
<td>-</td>
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#### Model Fit

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<tr>
<th></th>
<th>CRM</th>
<th>BP</th>
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</thead>
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<tr>
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marked in bold = SIC

SIC < AVE

should > 0.8 should > 0.7 should > 0.5

SIC > 0.8 should > 0.7 should > 0.5
## Appendix 12: Model fit indices and CFA of revised model (V2)

### Customer Relationship Management

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<th>AVE</th>
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<th>(B)</th>
<th>(C.1)</th>
<th>(C.2)</th>
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<td>0.86</td>
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<td>-</td>
<td>0.55</td>
<td>0.38</td>
<td>0.43</td>
<td>0.36</td>
</tr>
<tr>
<td>(B) CRM Planning and Implementation</td>
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<tr>
<td>(C.1) Analytical CRM - Technologies</td>
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<td>0.87</td>
<td>0.72</td>
<td>0.61</td>
<td>0.72</td>
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<td>0.55</td>
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<tr>
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<tr>
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marked in bold = SIC

should > 0.8  should > 0.7  should > 0.5  SIC < AVE

### Business Performance

<table>
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<tr>
<th>Business Performance</th>
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<th>SD</th>
<th>Sig. (2-tailed)</th>
<th>Valid Cases / Missing</th>
<th>Test of Normality / KS (Sig.)</th>
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<th>AVE</th>
<th>(E)</th>
<th>(F)</th>
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<tr>
<td>(F) External customer satisfaction</td>
<td>6.91</td>
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<td>0.00</td>
<td>100 % / 0%</td>
<td>0.00</td>
<td>0.84</td>
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<td>0.57</td>
<td>0.75</td>
<td>-</td>
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</tr>
<tr>
<td>(G) Financial performance</td>
<td>6.86</td>
<td>1.77</td>
<td>0.00</td>
<td>100 % / 0%</td>
<td>0.00</td>
<td>0.86</td>
<td>0.71</td>
<td>0.61</td>
<td>0.71</td>
<td>0.77</td>
<td>-</td>
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marked in bold = SIC

should > 0.8  should > 0.7  should > 0.5  SIC < AVE

### Model Fit

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<th>Model Fit</th>
<th>CRM</th>
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<tbody>
<tr>
<td>Chi-Square (χ²)</td>
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<td>123,347</td>
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<tr>
<td>SRMR</td>
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</tbody>
</table>

should > 0.9  should > 0.9  should > 0.9  should > 0.9  should between 0.03 and 0.08  should < 0.1

CRM part did not change compared to the revised model (V1)
### Appendix 13: Model fit indices and CFA of revised and final model (V3)

#### Customer Relationship Management

<table>
<thead>
<tr>
<th>Mean</th>
<th>SD</th>
<th>Sig. (2-tailed)</th>
<th>Valid Cases / Missing Cases</th>
<th>Test of Normality / KS (Sig.)</th>
<th>α</th>
<th>CR</th>
<th>AVE</th>
<th>(A)</th>
<th>(B)</th>
<th>(C.1)</th>
<th>(C.2)</th>
<th>(D)</th>
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<tbody>
<tr>
<td>(A) CRM Strategy</td>
<td>4.97</td>
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<td>0.00</td>
<td>100 % / 0%</td>
<td>0.00</td>
<td>0.86</td>
<td>0.81</td>
<td>0.67</td>
<td>-</td>
<td>0.55</td>
<td>0.38</td>
<td>0.41</td>
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<tr>
<td>(B) CRM Planning and Implementation</td>
<td>5.00</td>
<td>1.56</td>
<td>0.00</td>
<td>100 % / 0%</td>
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<td>0.92</td>
<td>0.83</td>
<td>0.69</td>
<td>0.74</td>
<td>-</td>
<td>0.51</td>
<td>0.57</td>
</tr>
<tr>
<td>(C.1) Analytical CRM - Technologies</td>
<td>4.94</td>
<td>1.62</td>
<td>0.00</td>
<td>100 % / 0%</td>
<td>0.00</td>
<td>0.88</td>
<td>0.87</td>
<td>0.72</td>
<td>0.61</td>
<td>0.72</td>
<td>-</td>
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<td>(C.2) Analytical CRM - Usage</td>
<td>4.04</td>
<td>1.30</td>
<td>0.00</td>
<td>100 % / 0%</td>
<td>0.00</td>
<td>0.89</td>
<td>0.80</td>
<td>0.66</td>
<td>0.64</td>
<td>0.75</td>
<td>0.74</td>
<td>-</td>
</tr>
<tr>
<td>(D) CRM Success measurement</td>
<td>5.04</td>
<td>1.61</td>
<td>0.00</td>
<td>100 % / 0%</td>
<td>0.00</td>
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<td>0.90</td>
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<td>0.59</td>
<td>0.75</td>
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Marked in bold = SIC

#### Business Performance

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<th>Mean</th>
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<th>Valid Cases / Missing Cases</th>
<th>Test of Normality / KS (Sig.)</th>
<th>α</th>
<th>CR</th>
<th>AVE</th>
<th>(E)</th>
<th>(F)</th>
<th>(G)</th>
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<td>(E) Internal business processes</td>
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<td>-</td>
<td>0.51</td>
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<tr>
<td>(F) External customer satisfaction</td>
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<td>0.00</td>
<td>100 % / 0%</td>
<td>0.00</td>
<td>0.81</td>
<td>0.65</td>
<td>0.58</td>
<td>0.71</td>
<td>-</td>
</tr>
<tr>
<td>(G) Financial performance</td>
<td>6.66</td>
<td>1.77</td>
<td>0.00</td>
<td>100 % / 0%</td>
<td>0.00</td>
<td>0.86</td>
<td>0.70</td>
<td>0.60</td>
<td>0.69</td>
<td>0.75</td>
</tr>
</tbody>
</table>

Marked in bold = SIC

#### Model Fit

<table>
<thead>
<tr>
<th>Model Fit</th>
<th>CRM</th>
<th>BP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square ($\chi^2$)</td>
<td>426.100</td>
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<tr>
<td>The Goodness of Fit Index (GFI)</td>
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<tr>
<td>NFI</td>
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<td>CFI</td>
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<td>0.979</td>
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<td>RMSEA</td>
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<td>0.059</td>
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<td>SRMR</td>
<td>0.035</td>
<td>0.026</td>
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</table>

Should > 0.8  should > 0.7  should > 0.5  SIC < AVE

Should > 0.9  should > 0.9  should > 0.9

Should between 0.03 and 0.08

Should < 0.1
### Appendix 14: Harman’s Single-Factor Test (SPSS) & Common Factor Analysis (AMOS)

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<td>% of Variance</td>
<td>Cumulative %</td>
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Extraction Method: Principal Component Analysis.
### Total Variance Explained (CRM)

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<th>Component</th>
<th>Total</th>
<th>% of Variance</th>
<th>Cumulative %</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Total</th>
<th>% of Variance</th>
<th>Cumulative %</th>
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Extraction Method: Principal Component Analysis.

### Total Variance Explained (BP)

<table>
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<th>Component</th>
<th>Total</th>
<th>% of Variance</th>
<th>Cumulative %</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Total</th>
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Extraction Method: Principal Component Analysis.
# Appendix 15: Research model comparison

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<th>Uni-dimensional Model</th>
<th>4-dimensional model</th>
<th>5-dimensional model</th>
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<td>Chi-Square ($\chi^2$)</td>
<td>168.137</td>
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<td>822.94</td>
</tr>
<tr>
<td>Degrees of freedom</td>
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<td>332</td>
</tr>
<tr>
<td>Probability level</td>
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<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
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</tr>
<tr>
<td>NFI</td>
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<td>0.92</td>
</tr>
<tr>
<td>CFI</td>
<td>0.97</td>
<td>0.94</td>
<td>0.95</td>
</tr>
<tr>
<td>RMSEA</td>
<td>0.08</td>
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<td>0.05</td>
</tr>
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</table>

The Goodness of Fit Index (GFI) should be > 0.9
NFI should be > 0.9
CFI should be > 0.9
RMSEA should be between 0.03 and 0.08

### Hypotheses

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>S.R.W</th>
<th>S.E</th>
<th>C.R.</th>
<th>p</th>
</tr>
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<tr>
<td>H0: Customer Relationship Management → Business Performance</td>
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<td>0.07</td>
<td>10.19</td>
<td>***</td>
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<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
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*** = statistically significant at the 0.001 level

### Relationships

<table>
<thead>
<tr>
<th>Relationships</th>
<th>S.R.W</th>
<th>S.E</th>
<th>C.R.</th>
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<tbody>
<tr>
<td>CRM Strategy ↔ CRM Implementation</td>
<td>0.83</td>
<td>0.13</td>
<td>11.54</td>
</tr>
<tr>
<td>CRM Implementation ↔ CRM Success Measurement</td>
<td>0.82</td>
<td>0.12</td>
<td>11.88</td>
</tr>
<tr>
<td>CRM Strategy ↔ CRM Success Measurement</td>
<td>0.86</td>
<td>0.12</td>
<td>10.15</td>
</tr>
<tr>
<td>CRM Strategy ↔ Analytical CRM (aCRM)</td>
<td>0.75</td>
<td>0.12</td>
<td>10.68</td>
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<tr>
<td>CRM Implementation ↔ Analytical (aCRM)</td>
<td>0.86</td>
<td>0.12</td>
<td>11.79</td>
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<tr>
<td>Analytical CRM (aCRM) ↔ CRM Success Measurement</td>
<td>0.90</td>
<td>0.13</td>
<td>12.17</td>
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S.R.W, S.E, C.R. should be > 0.1

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### Appendix 16: Summary of key statements from the discussion of findings

<table>
<thead>
<tr>
<th>Key statements - CRM Constructs</th>
<th>Key statements - BF Constructs</th>
<th>Key statements - Hypotheses discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CRM Strategy</strong>&lt;br&gt;• CRM strategy does not include customer feedback and is not embedded into business strategy and therefore seen as ‘isolated’ instrument for marketing, sales and service.&lt;br&gt;• Business departments, especially marketing, impact CRM strategy more than IT departments.&lt;br&gt;• CRM strategy requires data insights and therefore analytical technologies, no matter if the organisation is data-driven or not.&lt;br&gt;• aCRM technology supports the creation and development of CRM strategy&lt;br&gt;• The strong relationship between aCRM usage and aCRM strategy implies that organisations implicitly incorporate customer feedback (e.g. reasons for complaints) into their strategy.&lt;br&gt;• CRM strategy needs a comprehensive success measurement, which is multi-dimensional (internal, external and financial) and available for all affected employees within an organisation.</td>
<td><strong>Internal process efficiency</strong>&lt;br&gt;• Effectiveness of communication, perceived employee satisfaction and complexity of processes are not reliable measures to estimate the process efficiency of an organisation.&lt;br&gt;• Collaboration plays a major role to achieve internal process efficiency.&lt;br&gt;• Customer orientation and a good knowledge management support internal process efficiency as well.&lt;br&gt;• Process efficiency leads to higher customer satisfaction (and vice versa), which results in better financial performance: Customer satisfaction and process efficiency pay off.</td>
<td><strong>H1 - CRM Strategy positively affects BP</strong>&lt;br&gt;• CRM strategy does not impact BP, independently from the organisational size and ownership.&lt;br&gt;• CRM strategy is not linked to business performance, but managed isolated.&lt;br&gt;• Customer processes and internal activities are not aligned with a CRM strategy and therefore the strategy cannot influence BP.&lt;br&gt;• CRM efficiency and investment measures are initiated and managed re-actively and without a strategic assessment.&lt;br&gt;• B2B organisations do not implement CRM measures to assess the impact on BP&lt;br&gt;• Larger organisations seem to spend more for CRM strategy, however the impact on BP is not positive because they are not able to adopt fast enough and fail to implement&lt;br&gt;• Family-owned businesses with a CRM strategy tend to improve their BP, as they are able to change quickly and implement the strategy successfully.&lt;br&gt;• As the study assumed that organisations have a CRM strategy in place, it could not verify weather this is the case.</td>
</tr>
<tr>
<td><strong>CRM Planning and Implementation</strong>&lt;br&gt;• CRM planning and implementation is multi-dimensional and requires strong attention to organisational success factors such as a dedicated project management&lt;br&gt;• Clear requirement definitions help to plan, implement and measure the success of the CRM implementation&lt;br&gt;• (Smaller) Organisations do not clearly differentiate between training, change and communication programmes and seem to implement them all at once&lt;br&gt;• Project management impacts the success of CRM planning and implementation, but is not the key factor&lt;br&gt;• Good planning and implementation drives the usage of analytical technologies&lt;br&gt;• Success measurement can be considered as backbone for successful planning and implementation of CRM.</td>
<td><strong>External customer satisfaction</strong>&lt;br&gt;• The amount of customer complaints and survey responses does not influence customer satisfaction, but how organisations manage them.&lt;br&gt;• Customer response times are an appropriate measurement for customer satisfaction within the B2B industry.&lt;br&gt;• Customer referrals and positive customer ratings are good indicators and contribute to the overall customer satisfaction.&lt;br&gt;• Loyalty strongly contributes to the overall customer satisfaction of an organisation (except for monopolies).&lt;br&gt;• In the long-run, organisations will financially benefit if they invest in customer satisfaction.</td>
<td><strong>H2 - CRM Implementation and planning positively affect BP</strong>&lt;br&gt;• CRM planning and implementation has no effect on customer satisfaction, because organisations are not including customer requirements&lt;br&gt;• Internal process efficiencies are not measured after a successful CRM implementation&lt;br&gt;• Training, change management and communication is essential for the successful implementation but does not necessarily impact BP&lt;br&gt;• A successful implementation (i.e. project management) does not consider BP at all, but focuses on project-related success measures (e.g. delivered in time &amp; budget).&lt;br&gt;• CRM planning and implementation negatively impacts business performance for (small) family-owned businesses, due to unprofessional personnel, double work load and missing time for their daily business.&lt;br&gt;• (Small) Family-owned businesses often stop the implementation after a short time period and thereby realise a negative impact on BP.</td>
</tr>
<tr>
<td><strong>aCRM Technologies &amp; Applications</strong>&lt;br&gt;• Organisations are not aware of the difference between classification and clustering.&lt;br&gt;• Indicators for a strong usage of analytical technologies are forecasting and data visualisation.&lt;br&gt;• Organisations are focusing their efforts on customer retention, reasons for customer complaints and cross- and upselling applications.&lt;br&gt;• aCRM applications have a slightly stronger impact on the CRM strategy than its underlying technologies.&lt;br&gt;• aCRM applications support further developments of CRM and promote the results of CRM success measurements.</td>
<td><strong>Financial performance</strong>&lt;br&gt;• Total control CRM ownership is not a suitable measure to estimate the financial performance efficiency of an organisation.&lt;br&gt;• Well performance sales departments (i.e. with good lead-to-order conversion) contribute to the financial performance of the organisation.&lt;br&gt;• High market share enables organisations to be flexible and therefore contribute to financial stability and good performance.&lt;br&gt;• Net profit margin and sales revenue can be confirmed as major financial performance indicator for the B2B industry.</td>
<td><strong>H3 - aCRM technologies and applications positively affect BP</strong>&lt;br&gt;• aCRM has a moderate positive impact on BP, based on the available technologies such as forecasting, data visualisation or predictive analytics&lt;br&gt;• aCRM technologies have a weak positive effect on small organisations due to their ability to quickly identify field's applications&lt;br&gt;• aCRM technologies have a moderate positive effect on family-owned organisations due to their ability to quickly make decisions and investments as well as to do the actual implementation.&lt;br&gt;• Larger and more family-owned organisations do not increase their business performance with aCRM technologies&lt;br&gt;• aCRM technologies do not need to be developed by IT departments, as long as they support CRM users in their daily business.&lt;br&gt;• aCRM applications do not impact business performance, due to an inconsistent definition of applications and technologies.&lt;br&gt;• aCRM applications are not used consistently in terms of standardised analytical reports, data quality and missing company-wide measurement.&lt;br&gt;• Large organisations may be able to improve their business performance by using aCRM applications due to a higher degree of standardisation.</td>
</tr>
<tr>
<td><strong>CRM Success measurement</strong>&lt;br&gt;• Organisations which are performing CRM success measurement focus on the measurement of internal, external and financial improvements and not on operating costs.&lt;br&gt;• External and internal improvements are the strongest indicators for the success of CRM.&lt;br&gt;• Financial improvements are a good indicator to measure CRM success but they are affected by many other moderating factors.</td>
<td><strong>CRM success measurement impacts business performance</strong>&lt;br&gt;• Costs are not directly monitored within CRM success measurement but may be incorporated when assessing financial improvements.&lt;br&gt;• Organisations assessing CRM success by comparing BP indicators before and after the CRM implementation is initiative.&lt;br&gt;• Assessing the success or failure of CRM itself allows organisations to communicate benefits or to re-allocate resources, both positively impacts BP.&lt;br&gt;• Communicating the success (or failures) of CRM itself allows organisations to drive change pro-actively and it forces the project team to focus on the actual outcomes.&lt;br&gt;• Small and family-owned organisations benefit from CRM success measurement, as they are less experienced with CRM and therefore need to re-adjut their implementations more often.&lt;br&gt;• The business performance of large organisations is less dependent on the CRM success, as their business is widely spread.</td>
<td><strong>H4 - CRM success measurement positively affects BP</strong>&lt;br&gt;• CRM success measurement impacts business performance&lt;br&gt;• Costs are not directly monitored within CRM success measurement but may be incorporated when assessing financial improvements.&lt;br&gt;• Organisations assessing CRM success by comparing BP indicators before and after the CRM implementation is initiative.&lt;br&gt;• Assessing the success or failure of CRM itself allows organisations to communicate benefits or to re-allocate resources, both positively impacts BP.&lt;br&gt;• Communicating the success (or failures) of CRM itself allows organisations to drive change pro-actively and it forces the project team to focus on the actual outcomes.&lt;br&gt;• Small and family-owned organisations benefit from CRM success measurement, as they are less experienced with CRM and therefore need to re-adjut their implementations more often.&lt;br&gt;• The business performance of large organisations is less dependent on the CRM success, as their business is widely spread.</td>
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</table>
Appendix 17: UPR16 Submission form

**FORM UPR16**
Research Ethics Review Checklist
Please include this completed form as an appendix to your thesis (see the Research Degrees Operational Handbook for more information)

<table>
<thead>
<tr>
<th>Postgraduate Research Student (PGRS) Information</th>
<th>Student ID: up838685</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PGRS Name:</strong> Manuel Kern</td>
<td></td>
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<tr>
<td><strong>Department:</strong> Business &amp; Management Generalist Business</td>
<td></td>
</tr>
<tr>
<td><strong>First Supervisor:</strong> Giampaolo Viglia</td>
<td></td>
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<tr>
<td><strong>Start Date:</strong> 01.10.2016</td>
<td></td>
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<tr>
<td><strong>Study Mode and Route:</strong> Part-time</td>
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<tr>
<td><strong>Title of Thesis:</strong> EFFECTS OF CUSTOMER RELATIONSHIP MANAGEMENT (CRM) IMPLEMENTATION ON BUSINESS PERFORMANCE IN BUSINESS TO BUSINESS (B2B) MARKETS IN GERMANY</td>
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<td><strong>Thesis Word Count:</strong> 86.687</td>
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<td><strong>UKRIO Finished Research Checklist:</strong></td>
<td></td>
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<td>(If you would like to know more about the checklist, please see your Faculty or Departmental Ethics Committee rep or see the online version of the full checklist at: <a href="http://www.ukrio.org/what-we-do/code-of-practice-for-research">http://www.ukrio.org/what-we-do/code-of-practice-for-research</a>)</td>
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<tr>
<td>a) Have all of your research and findings been reported accurately, honestly and within a reasonable time frame?</td>
<td>YES</td>
</tr>
<tr>
<td>b) Have all contributions to knowledge been acknowledged?</td>
<td>YES</td>
</tr>
<tr>
<td>c) Have you complied with all agreements relating to intellectual property, publication and authorship?</td>
<td>YES</td>
</tr>
<tr>
<td>d) Has your research data been retained in a secure and accessible form and will it remain so for the required duration?</td>
<td>YES</td>
</tr>
<tr>
<td>e) Does your research comply with all legal, ethical, and contractual requirements?</td>
<td>YES</td>
</tr>
</tbody>
</table>

**Candidate Statement:**
I have considered the ethical dimensions of the above named research project, and have successfully obtained the necessary ethical approval(s)

**Ethical review number(s) from Faculty Ethics Committee (or from NRES/SCREC):** BAL/2019/6/KERN

If you have not submitted your work for ethical review, and/or you have answered ‘No’ to one or more of questions a) to e), please explain below why this is so:

<table>
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<tr>
<th><strong>Signed (PGRS):</strong> Manuel Kern</th>
<th><strong>Date:</strong> February 12th, 2020</th>
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</thead>
</table>
10. References


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