INCREASING THE LEVEL OF CUSTOMER ORIENTATION – A BIG DATA CASE STUDY FROM INSURANCE INDUSTRY

Research in Progress

Tiefenbacher, Katja, University of Duisburg-Essen, Duisburg, Germany,
    katja.tiefenbacher@uni-due.de

Olbrich, Sebastian, University of Duisburg-Essen, Duisburg, Germany,
    sebastian.olbrich@uni-due.de

Abstract

The paper positions Big Data as a challenge of information integration into existing analytical infrastructures. The presented arguments have been derived by means of a case study. The case is selected from the domain of insurance industry that intends to leverage the potential of Big Data for the purpose of increased customer orientation. Particularly the application of advanced analytics on a broader information base, i.e. include data that has been collected by the distributed sales force, promised to be a fruitful approach. Yet, we can mainly learn from areas in which the project initially failed. It will become obvious that the ability of a cross-functional process alignment is prerequisite to providing a consolidated view of customer information. It also seems to be essential for integrating external data sources. As a key take away, this paper will provide first heuristics and drafts a maturity model on how these challenges of integration will manifest themselves when applying Big Data techniques.

Keywords: Big Data, CRM, maturity, RBV, case study.

1   Introduction

The need for a sound understanding of the customer base has been in the center of discussion for quite a while and IS support has been vividly discussed under the term CRM Analytics (Bhattacharya, Godbole, Gupta, Verma, Achtermann and English, 2009; Lehmann, 2003; Nemati, Barko and Moosa, 2003). Yet, recent developments in terms of availability of user data and the technological means to access and analyze them, has added a new quality to the discussion. The reason might be a change in social behavior (i.e. people become more inclined to provide and share personal behavior on social media sites or to be involved in corporate communication or even in product development) combined with the capability to access, store and analyze these data (enabled mostly by innovations in database technologies e.g. in parallel data storage and processing). However, web analysis and text analysis (which has been a major investment in previous time) seems to be quite feasible for many organizations today. Most of these analyses belong to the field of Big Data analytics (Chen, Chiang and Storey, 2012). Applying Big Data analytics can increase the organization's ability to create a complete picture of its customers' preferences and demands being essential for effective customer orientation (Manyika, Chui, Brown, Bughin, Dobbs, Roxburgh and Byers, 2011; Watson, 2014). Yet, there is an obvious gap between the expectations of managers in applying Big Data and what is currently leveraged (Manyika et al., 2011). To date, the properties to be considered to gain the expected value of Big Data have not yet been clearly identified (Gartner, 2011; Snijders, Matzat and Reips, 2012).

Big Data can be considered to be a strategic resource of the organization (Wade and Hulland, 2004; Wernerfelt, 1984), and leveraging it can be regarded as the capability to ensure competitive advantage (Helfat and Peteraf, 2003; Teece et al., 1997; Winter, 2003). Therefore, our overall research agenda follows the Resource-Based View of the firm (RBV) and aims to shed light on the role of Big Data in the resulting nexus of capabilities enhancing customer orientation. Thereby we focus on companies applying a market-oriented business strategy. In order to derive tangible conclusions, we further investigate the following question in detail: *What is the impact of Big Data on the capabilities that enable customer orientation?* To investigate this question, we closely examine a German cross-segment insurance group that intends to apply Big Data for the purpose of increase in its cross- and up-selling rate. In order to produce viable results in the rather explorative nature of the study, we make use of a case study approach (Gibbert, Ruigrok and Wicki, 2008; Lee, 1989; Yin, 2008). We describe obstacles to be overcome in the context of the insurer's customer relationship management (CRM) strategy and provide a clearer picture of the role of Big Data in the context of customer orientation.

In the next sections we provide the background and the methodology for our research. The case study is introduced in the fourth section followed by the presentation of our first results and an outlook to our future research agenda.

2 Background

2.1 The integration challenge of Big Data

In order to gain competitive advantage in a volatile business environment, large organizations increasingly face the need to maintain and analyze large amounts of structured and unstructured data (Davenport and Harris, 2007; Laney, 2001). These data are derived from inside and outside a company's organizational borders. The sheer volume, variety and velocity of these data combined represent a phenomenon that is usually summarized by the term 'Big Data' (Laney, 2001). Our own definition of Big Data also refers to these three properties volume, variety and velocity (three Vs) and emphasizes the importance of all three Vs being combined in order to speak of a new phenomenon. In previous studies we could identify a crucial difference between Big Data applications incorporating all three properties and those incorporating less (Tiefenbacher and Olbrich, 2015). For the former a new phenomenon arises through the incorporation of new unstructured and heterogeneous data sources. All other Big Data applications focus on the optimization of current business processes. We consider those Big Data use cases as some kind of reincarnation of Business Intelligence (BI) and Analytics as they seem to be a logical development building on a large base of knowledge grounded in these fields (Baars, Funke, Müller and Olbrich, 2014).

Speaking of the 'variety' of data we distinguish between structured and unstructured data as well as between data generated by machines, i.e. sequence, format and possible content are primarily predetermined by mechanical systems (Manyika et al., 2011), and data that is generated by human beings, thus representing the outcome of the users' behavior, e.g. web logs, reviews, tweets, GPS data, blogs, click streams etc. (Chen et al., 2012; Watson, 2014). Applications incorporating all three Vs, i.e. Big Data, focus much more on unstructured data as well as those generated by human beings, than applications considering only one or two of the three Vs (Tiefenbacher and Olbrich, 2015). The current scope of Business Analytics still relies on mostly structured data sources from within the organization; which accounts for only a fraction of the actual information flow within an organization (Hilbert and López, 2011). Big Data expands this scope with a variety of additional data sources that may lie inside the organizational borders, e.g. employees' call center notes, phone calls, e-mails etc., as well as outside, e.g. blogs, social media platforms, newsgroups etc. The ability to embrace a bigger variety of data through the incorporation of unstructured as well as human generated data offers the opportunity to gain better insights into the market, e.g. these data often contain rich information about customer opinions and consumer behavior (Chen et al., 2012; Schroeck and Smart, 2012). Integrating all these aspects into an information system (IS) is a challenging (big) task. On top of that, further compliance

restrictions apply, in particular when processing personalized data. Hence, we hypothesize that the success of Big Data depends largely on the maturity of existing IS that Big Data analytics has to be integrated into.

2.2 The Resource-Based View of the firm

The term 'Resource-Based View of the firm' (RBV) was coined by Wernerfelt (1984) and builds upon earlier work (Learned, Christensen, Andrews and Guth, 1969; Penrose, 1959). RBV is commonly used to articulate corporate strategy in order to gain competitive advantage. The RBV is widely and increasingly used in the IS domain to explain how information systems relate to the strategy and performance of an organization (Wade and Hulland, 2004). Accordingly, we consider Big Data as a strategic resource of the organization.

In the eyes of the RBV, an organization is a collection of resources, i.e. capabilities or assets. In this study, we share Wernerfelt's (1984, p.172) understanding of resources as "anything which could be thought of as a strength or weakness of a given firm." Resources embrace both capabilities and assets (Wade and Hulland, 2004) while the term capabilities refers to the ability of an organization to perform a coordinated set of tasks (processes) for the purpose of achieving a particular end result (Helfat and Peteraf, 2003). Assets, on the other hand, are defined as anything tangible or intangible the firm can use in these processes (Wade and Hulland, 2004). Capabilities can thus be viewed as repeatable patterns of actions (Wade and Hulland, 2004) or coordinated set of tasks (Helfat and Peteraf, 2003) or both – i.e. processes that utilize assets as input (Amit and Shoemaker, 1993; Helfat and Peteraf, 2003). Accordingly, we speak of processes as being designed to manage the continuous adjustment of an organization to its environmental context.

2.3 Customer orientation and customer analytics

Access to market information has been a key success factor for market orientation in businesses for many years (Porter, 1980). Market orientation is defined as a corporate culture that is "systematically and entirely committed to the continuous creation of superior customer value" (Slater and Narver, 1994). It allows a firm to respond rapidly to external environmental change (e.g., shifts in customer preference and change in competitors' strategies), thereby enhancing firm performance (Day, 1994; Narver and Slater, 1990). One of the major components of market orientation is customer orientation, i.e. the understanding of a firm's potential customers' preferences as they are today and as they might be in the future (Narver and Slater, 1990). The information about each customer's preferences of several attributes of a product can be utilized to provide more individualized offers through the development of new products and services, i.e. (mass) customization, or through cross-selling, i.e. "selling an additional product or service to an existing customer" (Li, Sun and Montegomery, 2011).

The creation of "improved shareholder value through the development of appropriate relationships with key customers and customer segments" is the core concern of CRM (Payne and Frow, 2005). Hence, the implementation of CRM demonstrates a firm's customer-orientated behavior. Classification of activities in CRM can be derived by looking at the scope of strategy, process and IT. Based on Payne and Frow's (2005) conceptual framework for CRM strategy development, Iriana and Buttle (2006) introduced a differentiation between three forms of CRM: Strategic, Operational and Analytical (SOA). Strategic CRM mainly depends on an organization's business strategy and its customer strategy. In this way, strategic CRM follows a top-down approach that supports relationship building through more individualized offers in order to enhance revenues (Iriana and Buttle, 2006). Operational CRM focuses on the management of physical and virtual channels through which customers and organizations communicate and transact. The goal of operational CRM is to improve the efficiency and accuracy of customer contacts including sales, marketing and service functions across various channels to capture cost savings (Iriana and Buttle, 2006). Analytical CRM follows a bottom-up approach that focuses on the analysis of data to enhance customer understanding, enable appropriate cross-selling attempts or better targeting of offers (Iriana and Buttle, 2006).

3 Methodology

3.1 Theoretical foundation and research model

By following the RBV that describes organizations as collections of distinct resources and procedures we aim to investigate the impact of Big Data on the capabilities that enable customer orientation. As our research question is related to the context of customer orientation, for us, leveraging Big Data requires a set of capabilities that are interrelated with CRM. For the development of our research model we referred to the differentiation of strategic, operational and analytical CRM as introduced in section 2.3. This is pretty much in line with previous studies that introduce a set of capabilities from analytical, operational and strategic CRM as well as their interaction that determine the success of CRM, e.g. a cross-functional integration of strategy, processes and people that is enabled through a consolidated IS-infrastructure etc., (Coltman, Devinney and Midgley, 2011; Payne and Frow, 2005; Plakoyiannaki and Tzokas, 2002). Our resulting research model is depicted in Figure 1.
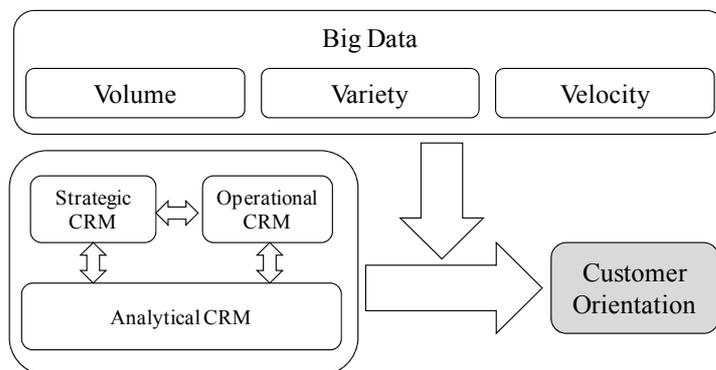

Figure 1.   Research model

Yet, a clear picture of the capabilities that are interrelated with Big Data is still missing in our research model. We can derive known capabilities from existing literature, e.g. the capabilities of analytical CRM seem to be related to the field of BI particular since the domain of CRM is an overall integrative challenge: The integration of large data sets in order to prepare them for analysis and visualization (Moss and Atre, 2003; Olbrich, Niehaves and Pöppelbuß, 2011; Turban, Sharda, Delen and Aronson, 2011; Watson, 2010; Wixom and Watson, 2001). Therefore, existing concepts of Data Governance (Aiken and Gorman, 2013; Logan, 2010) or of Data Quality Management (Ballou and Tayi, 1999; Strong, Lee and Wang, 1997; Work, 2002) might be applied to a certain extent. Also, the capability to manage the success factors of current analytics software (Hawking and Sellitto 2010; Olbrich et al., 2011; Wixom and Watson, 2001; Yeoh and Koronios, 2010) might be still relevant in the context of Big Data. Yet, due to further expansion of the availability of information, also from beyond organizational borders, these concepts should be extended for Big Data. Hence, in order to successfully leverage Big Data there is a delta required that represents the extension of well-known capabilities, thus resulting in new capabilities. These new capabilities have not yet been clearly carved out in existing literature. Therefore, it is part of our research agenda to identify these new capabilities and to map them to known capabilities from existing literature in order to investigate dependencies and interrelationships.

3.2 Case study design

In the context of different case studies we will explore these new capabilities in our future research. In order to produce viable results in the rather explorative nature of our study, we make use of a case study approach (Gibbert et al., 2008; Lee, 1989; Yin, 2008). Part of our previous research has been already an analysis of more than 100 Big Data success stories covering several industries and functional areas (Tiefenbacher and Olbrich, 2015). To present the difference in capabilities that are

needed to leverage Big Data we go into more detail and therefore make use of a specific case study from the insurance industry. Our research model ends with customer orientation although we are well aware that customer orientation can be utilized for different purposes, e.g. mass customization. However, in the presented case study the focus is on unleashing the potential of existing products through increased cross-selling. One of the authors was involved in the presented case study when the investigated company faced several challenges posed in the improvement of cross-selling campaigns in a Big Data context. The observations described in the following are derived from interviews as well as the author's own participation in the role of a sub-project leader.

According to Lee (1989), it is part of our research to add a brief analysis in order to address the questions of repeatability and generalizability of our case study. First of all, we will refer to the first of four core questions in case study research: *What is the initial setting in the case study and is it bound to specific situational and historical circumstances?* The investigated company is one of Germany's largest mutual insurance groups. The company's business portfolio is broadly diversified and its premium income is split into the segments of non-life, life and health. The group's portfolio gets complemented by a direct insurer providing products in the segments of life, health and property insurance to private clients throughout Germany. Because of the regulatory requirement that different insurance segments must be operated financially independent, the administration of the insurer's customer base is rather heterogeneous in the initial setting. Moreover, the group's sales force and the central marketing department operate locally and independently. Therefore our case is specific to organizational structures with high complexity. Due to the transaction- and customer-intensive nature of the industrial sector of insurance the case study provides a high potential to benefit very strongly from Big Data. However, this might also apply to other industrial sectors, e.g. the financial sector. It is for these reasons that Big Data offers a high potential for insurance companies such as optimizing their CRM efficiency through improved customer segmentation and analysis in near real time or the development of new products and services that are tailored to individual customer needs (Cusano, 2014; Manyika et al., 2011).

4   Case Study: Insurance Group

In the presented case study, the insurance group has launched a strategic CRM initiative that aims to enhance revenues through improved cross- and up-selling campaigns. Earlier, marketing and sales activities have been focused on a specific segment only. With the new initiative the insurance group wants to improve this situation in order to enhance revenues. Cross-selling is rather challenging for the group because of its diversified insurance segments. Taking into account this objective the insurer intends to achieve central analytical capabilities based on near real time analyses of its customers' preferences, its behavioral patterns as well as relations between customers like the identification of households for customer profiling and segmentations along the specific service offering of the insurance group, i.e. enhanced customer orientation.

The data for these analyses shall be derived from structured data sources, i.e. various portfolios and claims systems as well as operational CRM applications, and from new unstructured data sources (variety), e.g. e-mails, sales force notes and data from call centers that are continuously generated (velocity). All these internal data sources together generate massive amounts of data (volume). To complete the picture of its customers' preferences and demands the insurance group also intended to incorporate external data sources, e.g. social media, geographical information, socio-demographic data etc. These internal and external data sources' volume, variety and velocity combined provide a challenge of Big Data. From leveraging these Big Data the insurer expects to receive synergy effects through the combination of the individualized sales force's know-how, as he has gained specific information about his customers through personal contact, and the group's centralized support. For example, the central marketing department might provide the decentralized sales force with up-to-date customer information gained from social media platforms right before the respective customer gets contacted.

An alignment of existing and new internal and external data sources is rather challenging as the underlying processes of the direct insurer, the central marketing department and the exclusive sales force differ in scope and context. The group's sales activities are accomplished by the group's exclusive sales force as well as the central marketing department. Hence, these activities are rather decentralized as depicted in Figure 2.
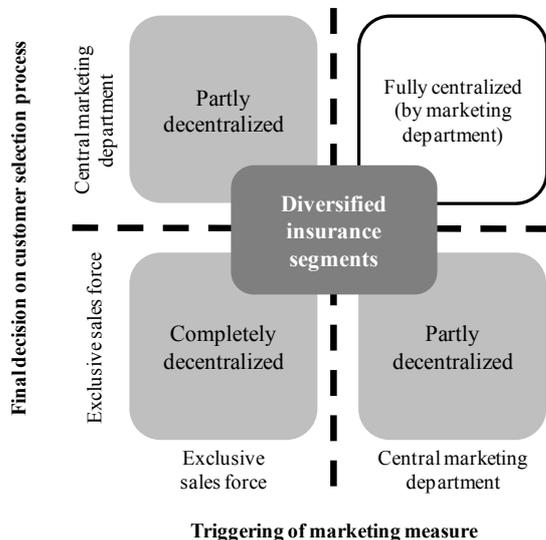

Figure 2.   Alignment of sales force and central marketing department

While defining customers to be contacted for a respective marketing measure, the customer selection process can be accomplished by the central marketing department alone, thus providing the sales forces with the final list, or the sales force might be involved in this process (see upper and lower half of Figure 2). Besides, the actual triggering of the particular marketing measure can be either determined by the exclusive sales force (left half in Figure 2) or by the marketing department itself (right half in Figure 2). The activities are completely decentralized if the central marketing department proposes a customer selection in the first place that gets adjusted by the sales force agent who also triggers the respective marketing measure (see lower left cluster in Figure 2). Moreover, the entities for each of the different insurance segments operate separately resulting in compartmentalized processes and a heterogeneous IS landscape which ultimately results in a non-homogenous administration of the customer base. In the initial setting, the insurer's corporate Data Warehouse (DWH) provided different data marts specific to each of the group's diversified insurance segments only and therefore it was not possible to provide cross-segment customer information, e.g. numbers of contracts or premiums per customer. As the group's direct insurer has its independent market appearance, it also applies its own sales model. Hence, the insurance group was simply not able to provide an integrated view of its diverse business processes in the first instance. Consequently, it was unable to handle the increased data volume that was derived from the execution of these processes.

As a counter measure, the insurer started an integration initiative to align these processes together with the implementation of a Big Data analytics solution. An important measure for the alignment between the central marketing department, the sales force and the direct insurer was the definition of an overall campaign management process (operational CRM). Another measure was the implementation of a central and consolidated front office CRM application. This application is a multi-channel software that offers all important functions and features in an integrated manner (operational CRM). Therefore the sales force as well as the central marketing department and the direct insurer can access all information that is relevant to their operational CRM activities involving direct interface with customers through a single application. Finally, the new Big Data analytics solution provides an overall, integrated view of the insurer's internal customer data (analytical CRM). The integration of data from external sources stays part of the group's future planning. It is for this reason that the insurer could not yet real-

ize the full potential of Big Data. However, the success of the group's cross-selling campaigns could already be improved.

According to Lee (1989), we will refer to the second of four core questions in case study research: *Which (design) conclusions are drawn from the case study data and are these conclusions bound to specific situational and historical circumstances?* The case study could derive first implications that depend on the organizational structure and the analytical context. The case of the insurance group depicts that in a Big Data context it is essential to achieve a cross-functional alignment of internal processes first, namely the cross-segment sales and marketing activities as well as those of the direct insurer, in order to enhance customer orientation.

5 Tentative conclusion and outlook

As part of our research agenda we aim to identify new capabilities that are required to leverage Big Data in the context of customer orientation, and map these to known capabilities from existing literature in order to investigate dependencies and interrelationships. Specifically, we argue that Big Data can increase cross-selling by enhancing capabilities of customer orientation. With the presentation of a major mutual insurance group and its challenges in introducing Big Data, we already derived some valuable insights for research and practice. Our first results point out that the success of Big Data largely depends on the cross-functional alignment of processes and the level of integration with distributed data. With an increased focus on data, organizational structures will be encouraged to collaborate more closely.

In the presented case we did not receive any insights as regarding specific analytical nor technological capabilities (especially regarding the integration of external data sources) that will be required to leverage Big Data. However, the reason of failure was not an issue of technological capabilities; instead it was a problem of information integration due to a misalignment of the underlying processes. This points out that in order to leverage Big Data a certain degree of analytical maturity is required in the first place. Hence, we intend to develop a Big Data maturity model in the field of CRM analytics. Our first proposal of the maturity model is depicted in Figure 3.
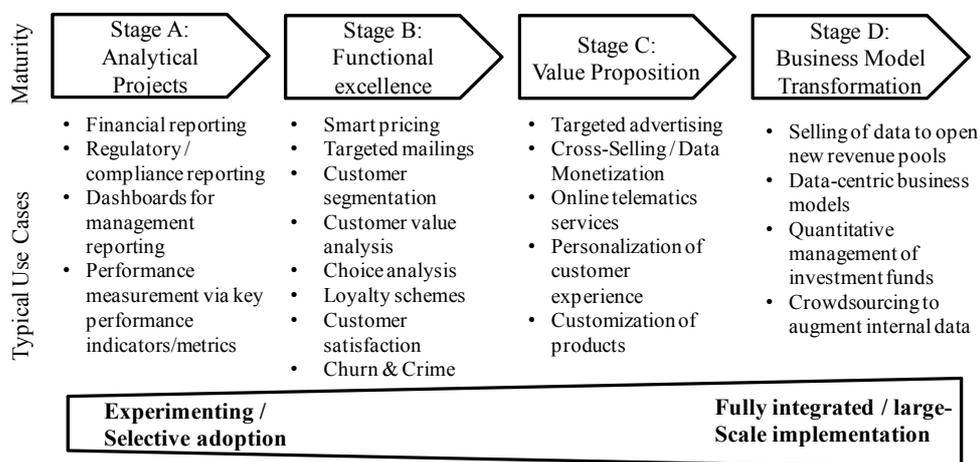

Figure 3.   Proposed maturity model for Big Data and CRM analytics

The model suggests different stages of analytical maturity that are indicated by typical use cases. It proposes to move stepwise from one stage to another, i.e. from less mature selective use cases (stage A) through functional excellence (stage B) and value proposition (stage C) towards a fully integrated analytical IS infrastructure (stage D). There are different capabilities required in order to move forward. The presented case study of the insurance group can be mapped to stage A in its initial setting. According to the group's CRM strategy it tries to achieve stage C. Getting directly from stage A to C

failed in the presented case as the corresponding capabilities were still missing. First, the insurer had to develop the capability to align its cross-segment sales and marketing activities as well as those of the direct insurer as baseline for information integration. By this, the groups' functional excellence in customer segmentation, targeted mailings etc. could be improved and the insurance group managed to reach stage B with regard to our proposed maturity model. Yet, the group needs to develop new capabilities for the integration of data from external sources to improve its value proposition and finally reach stage C. This situation is not atypical for the current state of Big Data use cases as most of the organizations are still experimenting with technology or only selectively adopting certain aspects of Big Data, while only a few companies invested in developing new capabilities (Tiefenbacher and Olbrich, 2015). However, in order to work towards a large scale customer orientation, it seems essential to push the first substantial Big Data use cases (stage A) towards a fully integrated analytical IS (stage D). We have made this observation due to major challenges in the presented case study. Conceptually this leads us to conclude that there might be valuable learning from failed Big Data projects. As opposed to a current over-emphasis of Big Data success stories that might be motivated by marketing strategies of vendors and consultants.

As our study is of preliminary nature, we are well aware of the fact that we are not able to provide a completed analysis. However, we would like to discuss first indications from our case study by referring to the last two questions of repeatability and generalizability (Lee, 1989), i.e.:

Do other settings show similar features and, thus, can the case study setting be generalized? Other domains that are less regulated in their business model might already be ahead when it comes to process alignment and data integration. Therefore, the observations are of particular value for the ones that face equally strong compliance requirements. Talking about regulations the handling personalized (customer) data concerns multiple settings.

Are the (design) conclusions made in the case study setting transferable to other organizational settings? Some implications can be derived from the study's results that seem to be applicable in other organizational settings, too. As indicated above, the value of data seems to be strongly depended on integration and therefore the availability of information within the organization through process alignment. Hence, Big Data might require a certain level of analytical maturity to deliver the promised value. We acknowledge however that resolving the integration challenge within the organizational borders might be less necessary in different settings as isolated data analysis might be sufficient (e.g. in production of factory), even more efficient (e.g. sentiment analysis or market research which is mostly conducted by specialized agencies) or even required (e.g. forensics). The case study is of preliminary nature in a way that the analysis is not yet complete and further interviews have to be conducted to explore further obstacles that may arise, especially while incorporating external data sources. Also, the results were not yet transferred to other organizational environments. Next, we will further investigate which capabilities are required to integrate Big Data and we will also carve out when integration is needed and under which circumstances Big Data can be sourced altogether.

References

Aiken, P. and Gorman, M. M. (2013). The Case for the Chief Data Officer: Recasting the C-Suite to Leverage Your Most Valuable Asset, Morgen & Kaufmann.

Amit, R. and Shoemaker, P. (1993). Strategic assets and organizational rent, Strategic Management Journal, 14 33–46.

Baars, H., Funke, K., Müller, P. A. and Olbrich, S. (2014). Big Data als Katalysator für die Business Intelligence – Das Beispiel der informa Solutions GmbH, HMD Praxis der Wirtschaftsinformatik, 51 (4), pp. 436-446.

Ballou, D. P. and Tayi, G. K. (1999). Enhancing data quality in data warehouse environments, Communications of the ACM, 42 (1), pp. 73-78.

Bhattacharya, I., Godbole, S., Gupta, A., Verma, A., Achtermann, J. and English, K. (2009). Enabling analysts in managed services for CRM analytics, Proceedings of the 15th ACM SIGKDD international conference on Knowledge discovery and data miningACM, Paris, France, pp. 1077-1086.

Chen, H., Chiang, R. and Storey, V. (2012). Business Intelligence and Analytics: From Big Data to Big Impact, MIS Quarterly Executive, 36 (4), pp. 1165-1188.

Coltman, T., Devinney, T. M. and Midgley, D. F. (2011). Customer Relationship Management and Firm Performance, Journal of Information Technology, 26 (3), pp. 205-219.

Cusano, J. M. (2014). Insurance Isn't Safe from Digital Upheaval, HBR Blog Network, Vol. 2014 Harvard Business Review.

Davenport, T. H. and Harris, J. G. (2007). Competing on Analytics: The New Science of Winning, Mcgraw-Hill Professional, Massachusetts.

Day, G. S. (1994). The Capabilities of Market-Driven Organizations, Journal of Marketing, 58 (4), pp. 37–53.

Gartner (2011). Gartner Says Solving 'Big Data' Challenge Involves More Than Just Managing Volumes of Data, Vol. 2012 Gartner, Inc.

Gibbert, M., Ruigrok, W. and Wicki, B. (2008). What passes as a rigorous case study?, Strategic Management Journal, 29 (13), pp. 1465-1474.

Hawking, P. and Sellitto , C. (2010). Business Intelligence (BI) Critical Success Factors, Australasian Conference on Information Systems (ACIS), Vol. Paper 4, Brisbane, Australia.

Helfat, C. E. and Peteraf, M. A. (2003). The dynamic resource-based view: capability lifecycles, Strategic Management Journal, 24 (10), pp. 997–1010.

Hilbert, M. and López, P. (2011). The World's Technological Capacity to Store, Communicate, and Compute Information, Science 332 (6025), pp. 60-65.

Iriana, R. and Buttle, F. (2006). Strategic, Operational, and Analytical Customer Relationship Management: Attributes and Measures, Journal of Relationship Marketing, 5 (4), pp. 23-34.

Laney, D. (2001). 3D Data Management: Controlling Data Volume, Velocity and Variety, Vol. File 949 META Group.

Learned, E. P., Christensen, R., Andrews, K. R. and Guth, W. D. (1969). Business Policy, Irwin, Home-wood, IL.

Lee, A. S. (1989). A Scientific Methodology for MIS Case Studies, MIS Quarterly, 13 (1), pp. 32–52.

Lehmann, P. (2003). CRM-Analytics im Fokus von Business Intelligence, In Customer Knowledge Management: Erste Ergebnisse des Projektes „Customer Knowledge Management – Integration und Nutzung von Kundenwissen zur Steigerung der Innovationskraft" (Ed, IRB, F.) Bungard, W., Fleischer, J., Nohr, H., Spath, D., Zahn, E., Stuttgart, pp. 71-78.

Li, S., Sun, B. and Montegomery, A. L. (2011). Cross-selling the right product to the right customer at the right time, JOURNAL OF MARKETING RESEARCH, 48 (4), pp. 683-700.

Logan, D. (2010). What is Information Governance? And Why is it So Hard?, Gartner Research.

Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C. and Byers, A. (2011). Big data: The next frontier for innovation, competition, and productivity, (Ed, Institut, M. G.) McKinsey & Company.

Moss, T. L. and Atre, S. (2003). Business Intelligence Roadmap: The Complete Project Lifecycle for Decision-support Applications, Addison-Wesley, Boston.

Narver, J. C. and Slater, S. F. (1990). The Effect of a Market Orientation on Business Profitability Journal of Marketing, 54 (4), pp. 20-35.

Nemati, H. R., Barko, C. D. and Moosa, A. (2003). E-CRM Analytics: The Role of Data Integration, Journal of Electronic Commerce in Organizations (JECO), 1 (3), pp. 73-89.

Olbrich, S., Niehaves, B. and Pöppelbuß, J. (2011). BI Systems Managers' Perception of Critical Contextual Success Factors: A Delphi Study, International Conference on Information Systems (ICIS), Shanghai, China.

Payne, A. and Frow, P. (2005). A Strategic Framework for Customer Relationship Management, Journal of Marketing, 69 (4), pp. 167-76.

Penrose, E. (1959). The Theory of Growth of the Firm, Blackwell, Oxford.

Plakoyiannaki, E. and Tzokas, N. (2002). Customer relationship management: A capabilities portfolio perspective, Journal of Database Marketing, 9 (3), pp. 228-237.

Porter, M. E. (1980). Industry Structure and Competitive Strategy: Keys to Profitability, Financial Analysts Journal, 36 (4), pp. 30-41.

Schroeck, M. J. and Smart, J. (2012). Analytics: The real-world use of big data, How innovative enterprises extract value from uncertain data, (Ed, Oxford, I. I. f. B. V. a. S. B. S. a. t. U. o.).

Slater, S. F. and Narver, J. C. (1994). Market Orientation, Customer Value, and Superior Performance, Business Horizons, 37 (2), pp. 22–28.

Snijders, C., Matzat, U. and Reips, U.-D. (2012). "Big Data": Big gaps of knowledge in the field of Internet Science, International Journal of Internet Science, 7 (1), pp. 1-5.

Strong, D. M., Lee, Y. W. and Wang, R. Y. (1997). Data quality in context, Communications of the ACM, 40 (5), pp. 103-110.

Teece, D. J., Pisano, G. and Shuen, A. (1997). Dynamic capabilities and strategic management, Strategic Management Journal, 18 (7), pp. 509–533.

Tiefenbacher, K. and Olbrich, S. (2015). Increasing the Value of Big Data Projects – Investigation of Industrial Success Stories, 48th Hawaii International Conference on System Sciences (HICSS), Kauai, Hawaii, January 5-8, 2015.

Turban, E., Sharda, R., Delen, D. and Aronson, J. E. (2011). Decision support and business intelligence systems, Pearson, Upper Saddle River, NJ.

Wade, M. and Hulland, J. (2004). Review: The Resource-Based View and Information Systems Research: Review, Extension, and Suggestions for Future Research, MIS Quarterly, 28 (1), pp. 107–142.

Watson, H. J. (2010). BI-based Organizations, Business Intelligence Journal, 15 (2), pp. 4-6.

Watson, H. J. (2014). Tutorial: Big Data Analytics: Concepts, Technologies, and Applications, Communications of the Association for Information Systems, 34 (1), pp. 1247-1268.

Wernerfelt, B. (1984). A Resource-based View of the Firm, Strategic Management Journal, 5 (2), pp. 171–180.

Winter, S. (2003). Understanding dynamic capabilities, Strategic Management Journal, 24 (10), pp. 991–995.

Wixom, B. H. and Watson, H. J. (2001). An Empirical Investigation of the Factors Affecting Data Warehousing Success, MIS Quarterly, 25 (1), pp. 17–41.

Work, B. (2002). Patterns of software quality management in TickIT certified firms, European Journal of Information Systems, 11 (1), pp. 61-73.

Yeoh, W. and Koronios, A. (2010). Critical Success Factors for Business Intelligence Systems, Journal of Computer Information Systems, Spring 2010 23-32.

Yin, R. K. (2008). Case Study Research: Design and Methods, Sage Publications Ltd.