New ways to leverage Web 2.0: Social media content for market intelligence and customer interaction

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Berlin, im Juli 2016 Aaron Wolfgang Baur

Overview of Research Output

Title	Authors	Type of Publication	VHB	Status	Respective Points
A Novel Design Science Approach for Integrating Chinese User-Generated Content in Non-Chinese Market Intelligence	*Baur, Aaron W.; Lipenkova, Janna; Bühler, Julian; Bick, Markus*	***Proceedings:*** *International Conference on Information Systems (ICIS, 2015)*	*A*	*published*	*0.75*
Harnessing the social web to enhance insights into people's opinions in business, government and public administration	*Baur, Aaron W.*	***Journal:*** *Information Systems Frontiers (ISF, 2016)*	*B*	*accepted*	*2.00*
Customer Service Experience through technology-enabled Social CRM – An exploratory analysis in the automotive industry	*Baur, Aaron W.; Bick, Markus*	***Journal:*** *Service Science (2016)*	*C*	*passed desk reject*	*0.75*
	Baur, Aaron W.; Henne, Johannes; Bick, Markus	***Proceedings:*** *Lecture Notes in Computer Science (LNCS, 2016)*	*C*	*accepted*	[0.5]*
Cryptocurrencies as a Disruption? Empirical Findings on User Adoption and Future Potential of Bitcoin and Co.	Baur, Aaron W.; Bühler, Julian; Bick, Markus; Bonorden, Charlotte S.	***Proceedings:*** Lecture Notes in Computer Science (LNCS, 2015)	C	published	0.375
Big Data, Big Opportunities: Revenue Sources of Social Media Services Besides Advertising	Bühler, Julian; Baur, Aaron W.; Bick, Markus; Shi, Jimin	***Proceedings:*** Lecture Notes in Computer Science (LNCS, 2015)	C	published	0.375
Mobile banking — insights on its increasing relevance and most common drivers of adoption	Ha, Kyung-Hun; Canedoli, Andrea; Baur, Aaron W.; Bick, Markus	***Journal:*** Electronic Markets (EM, 2012)	B	published	0.50
		Sum			**4.75**

N.B.: The manuscripts shaded grey and in *italic font* are included in the dissertation at hand.
* The asterisked paper is an improved revision of the *Service Science* paper.
The 0.5 points from *LNCS* are not included in the sum of points above.

Title	Authors	Type of Publication	VHB	Status	Respective Points
Catching Fire: Start-Ups in the Text Analytics Software Industry	Baur, Aaron W.; Breit-sprecher, Max; Bick, Markus	***Proceedings:*** Americas Conference on Information Systems (AMCIS, 2014)	D	published	-
How Pricing of Business Intelligence & Analytics SaaS Applications Can Catch Up With Their Technology	Baur, Aaron W.; Bühler, Julian; Bick, Markus	***Journal:*** Journal of Systems and Information Technology (JSIT, 2015)	-	published	-
Anacode Market Miner - Simplifying China	Baur, Aaron W.	***Proceedings:*** Multikonferenz Software Engineering & Management (SWM, 2015)	-	published	-
Customer is King? A Framework to Shift from Cost- to Value-Based Pricing in Software as a Service: The Case of Business Intelligence Software	Baur, Aaron W.; Genova, Antony C.; Bühler, Julian; Bick, Markus	***Proceedings:*** Conference on e-Business, e-Services and e-Society (I3E, 2014)	-	published	-
Barrieren und Potenziale	Bick, Markus; Baur, Aaron W.; Goetsch, Harald	***Journal:*** Die Personalwirtschaft (2013)	-	published	-
Barrieren und Potentiale des Human Resource Outsourcing – Eine empirische Studie	Bick, Markus; Goetsch, Harald; Baur, Aaron W.; Bühler, Julian; Ryschka, Stephanie	***Working Paper:*** ESCP Europe Working Paper No. 60 (2012)	-	published	-

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List of Abbreviations

BI&A	business intelligence & analytics
BRICS	Brazil, Russia, India, China and South Africa
B2B	business-to-business
B2C	business-to-consumer
C2G	citizen-to-government
DSR	design science research
(e)WOM	(electronic) word of mouth
ed.	edition
eds.	editors
et al.	et alii (and others)
e.g.	exempli gratia (for example)
FMCG	fast-moving consumer goods
G2C	government-to-citizen
i.e.	id est (that means)
IS	information systems
KM	knowledge management
NGO	non-governmental organization
NLP	natural language processing
p./pp.	page/s
SaaS	software as a service
(S)CRM	(social) customer relationship management
Vol.	volume

1 Introduction

The importance of providing corporate decision makers with a constant and trustworthy supply of information is unchallenged. In the wake of increasing worldwide economic turmoil and constantly high pressure from global competition, company executives are trying to save themselves through access to a more reliable information base and a deeper, more direct, and intimate relationship with their customers. The two are highly interrelated.

On the one hand, the information flows between organizations and people have traditionally been mostly unidirectional, whether taking place in a business-to-consumer (B2C) or a government-to-citizen (G2C) context. This centuries-old set-up of a basic, static, and limited flow of information has been revolutionized by the introduction of the Internet and, more particularly, by second-generation web technologies (Web 2.0, DiNucci 1999). The availability of easy-to-use forums, blogs, special interest groups, and other social media channels has opened up opportunities for ordinary people to engage easily with large corporate or governmental bodies by creating user-generated content (UGC). UGC was the main factor responsible for the massive growth of Web 2.0 and the unprecedented availability of information-rich content (Kaplan and Haenlein 2010). Commercial companies have actively gathered and analyzed these customer reviews and feedback since the early years of this century (Berry and Otley 2004; Bryman 2012), although they have mostly done so manually. Now, researchers and marketing managers have realized that a tremendous amount of data about customers' needs, wishes, ideas, feelings, and opinions is stored in social media. With the right tools, they can transform these data into information and finally into decision-relevant knowledge.

In the governmental or public policy context, the situation appears to be a little different: even though the concept of "open government," which means the systematic inclusion of citizens and other stakeholders in the public policy and value creation process, would create an ideal case for actively analyzing UGC, governmental agencies still lag behind (Estevez et al. 2012). The three main principles of open government, namely transparency, participation, and collaboration, fueled by open data (Zuiderwijk 2015), can only be realized if a solid information base about citizens' opinions has been established (Zuiderwijk et al. 2015). New tools and techniques to tap the "wisdom of the crowd" (Berthon et al. 2012) need to be developed. With them, the desired two-way dialogue of participation, public opinion and decision making, and direct democracy (Muñoz and Bolívar 2015; OECD 2010) can be ignited and public administration changed into a real citizen-to-government (C2G) relationship.

On the other hand, along with an increasingly service-oriented economy in a highly competitive environment, there is growing pressure to deliver a unique service experience to ensure customer satisfaction, retention, and referrals. This necessity to deliver outstanding service can be supported through a mixture of technology and personal interaction, that is, by "high tech and high touch" (Davis et al. 2011; Wunderlich et al. 2013). Likewise, few people can imagine their life without daily involvement in social media services, like Facebook, Twitter, or YouTube. Social media and Web 2.0 have advanced to constitute an important part of the economic, social, and technological conception of the Internet, which enables users to create content and build a network with other users (Musser and O'Reilly 2007). The results of user participation, such as posts, friend lists, and profiles, are accessible by other parties of the community (Ang 2011). This development attracts the attention of companies that aim to take advantage of the accompanying opportunities, for example by improving their reputation, influencing the purchase decision process of potential buyers, increasing their marketing efficiency, supporting cost

reductions, receiving post-purchase feedback, and innovating their products through co-creation (Baird and Parasnis 2011; Fliess et al. 2012; Jahn and Kunz 2012; Smith 2009).

The optimal use of technology to gain a better understanding of customers and improve customer satisfaction requires particular attention from marketing academia. The increased relevance of the opportunities and challenges are underpinned by the reports of the renowned Marketing Science Institute (MSI), which issues its "Research Priorities" biennially. The study captures "the areas of most interest and importance to MSI member companies" (Keller 2014). The two highest-ranked priorities *Understanding Customers and the Customer Experience* and *Developing Marketing Analytics for a Data-Rich Environment,* explicitly emphasize the importance of conducting more research on the customer service experience and call for the development of "new analytical methods to gain greater insights from unstructured data (e.g., social media)."

Overall, there is an obvious imperative for organizations to achieve both these aims: understand better what is written about them and their products and services on the Internet (Benthaus et al. 2013) *and* interact with customers more intimately (Baum et al. 2013) through social media channels. They must invest in automated solutions that collect, analyze, and visualize social media content, the sheer magnitude of which means that it can no longer be handled manually. This ideally should be carried out across languages, formats, and sources. Likewise, social media must be used in all channels to offer better customer service, faster response times, and higher customer satisfaction levels.

Hence, this doctoral thesis picks up these pain points and answers the following overarching research question: *how can organizations harness user-generated content from social media channels for market intelligence and improved customer interaction and service?*

2 Social Media Content for Market Intelligence and Customer Interaction

2.1 Background

To sell their products in today's buyers' markets, marketing practitioners and researchers feel the enduring pressure to cater exactly to their customers' needs and tastes. Intimate knowledge about customers and a strong effort to keep in close contact with them are prerequisites for the massive individualization and customization of product, price, promotion, and even place (with the advent of customizable online shopping portals) and the exploitation of new target groups (Specht 2014). However, these efforts to enhance individual value propositions must be based on knowledge about consumers' valuations and choice behaviors. Intensive market research and new ways of customer interaction are therefore carried out.

Traditionally, methods such as customer surveys and interviews were typically applied for these purposes (Parment 2014). However, these techniques are tedious, complex, time-consuming, and expensive (Kim et al. 2010). The survey, as the traditional "silver bullet" of social science, is therefore losing support amongst scientific and commercial (market) researchers (Bruhn 2010). To save costs and to move their craft into the realities of the twenty-first century, researchers are increasingly substituting classical customer surveys and gathering their data with non-reactive means, that is, through observation and listening rather than questioning (Haenlein and Kaplan 2012). Analyzing user-generated content (UGC) in social media may be the most prominent part of this "non-reactive" market research means (Tuma and Decker 2013), despite its challenges (see below).

Besides the imperative for deep knowledge and understanding, intimate customer interaction may be seen as the second pillar on which market success rests. Again, social media are one of the levers that marketers can pull. By combining the social media developments of Web 2.0 with the pervasiveness of customer interactions, the relatively new term "social customer relationship management" (SCRM) was born (Lehmkuhl and Jung 2013; Trainor et al. 2014). Social media analytics as well as social customer relationship management are the areas of interest here.

2.2 Concepts and definitions

As in many emerging fields in IS, buzz words, inconsistencies and terminological fuzziness are pertinent in the areas of "social media analytics," "big data," "data analytics," "business intelligence," "Web 2.0," and so on (Wilson et al. 2011).

First, for clarity, I follow the logic of Chen et al. (2012, p. 1166) in this dissertation and use business intelligence and analytics (BI&A) as a unified term that embraces "the techniques, technologies, systems, practices, methodologies, and applications that analyze critical business data to help an enterprise better understand its business and market and make timely business decisions." BI&A, as well as underlying data processing and analytical technologies, comprises practices and methodologies that are explicitly relevant to high-impact applications. I specifically examine BI&A, which takes UGC as its main data source; examples of such applications include e-commerce (Doan et al. 2011; Zwass 2010), market intelligence (di Gangi et al. 2010), science and technology (Hand 2010), politics (Karpf 2009; Wattal et al. 2010), health care (Gao et al. 2010), and public safety (Dang et al. 2014). Since the main focus of this thesis is the (commercial) automotive industry and its customer feedback and sentiment (Sashi 2012), I consider the term *market*

intelligence to be the most appropriate for describing the area of application. This term will therefore be used in the remainder of this thesis.

Second, "social media services" can be understood as "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content," according to Kaplan and Haenlein (2010). The term "social media services" is also linked to Web 2.0 by other authors and frequently used similarly to the expression "social network" or "social network site" (SNS) (e.g., Boyd and Ellison 2007; Chiang et al. 2009).

Third, "Web 2.0" (O'Reilly 2005; DiNucci 1999), the second generation of web interfaces that enable users to communicate, connect, share, and create content, has given power back to the people through the "participative web" (Vickery and Wunsch-Vincent 2007). Since it gradually established itself through an array of technological and societal developments, wide spread publishing of mostly non-professional content, as well as real back-and-forth, bi-directional communication have become possible (Lusch et al. 2010).

Finally, by "social CRM," the "integration of traditional customer-facing activities, including processes, systems, and technologies with emergent social media applications to engage customers in collaborative conversations and enhance customer relationships" (Trainor 2012, p. 321) is meant.

2.3 Market intelligence through unstructured content

As mentioned above, it has been standard practice for decades to obtain customer and market insights manually. Common methods include qualitative research, like focus groups, (marketing) ethnography, panels, and offline and online interviews. These are often followed by larger-scale quantitative methods based on surveys (Homburg 2015).

These methods increase the sample size but it is still not necessarily representative and unbiased, since the subjects are specifically prompted to reply to the marketer's request (Kuß 2012). Moreover, this kind of primary market research is related to high costs.

Authors (e.g., Cooke and Buckley 2008; Moran 2012) also argue that traditional methods of inquiry have come close to "crossing the frontier," that is, they have started to deliver unreliable results. This is true not only for marketing research but also for empirical research in general. People are weary of responding to umpteen questionnaires and no longer want to invest time in these forms of research. If they do, they try to minimize the time involved, which leads to results of very low quality (Baxter et al. 2015). These aspects contribute to the demise of the traditional market research toolbox and the need for innovative approaches, inter alia based on so-called "unstructured text" in social media (Keller et al. 2015).

Following one accepted classification, data can generally be stored in three different forms – structured (e.g., numbers in a database), semi-structured (e.g., text in an Excel sheet, XML data from RSS feeds), and unstructured (e.g., product reviews on a homepage, email messages, blog entries). The majority of data available to corporations are found in the semi- and unstructured arrangement, making up between 85% and 95% of all data (Schubmehl and Vesset 2014). Additionally, as users mostly write online content in their mother tongue, UGC exists in hundreds of different languages. Literal or conceptual translations are needed. Search platforms and analytics tools, however, are normally designed for a specific grammatical and semantic structure and are limited in their ability to process multi-language queries (Kawamura 2010).

Until recently, gaining reliable and decisive insights from these information sources was a time- and resource-consuming process. For information systems (IS), the automatic search, extraction, analysis, and visualization of unstructured data has long been a severe

challenge (Miner 2012). However, in the last few years, academic and commercial research on natural language processing (NLP) technologies has produced technologies and applications that offer the possibility to automate this process of unstructured extraction and processing of spoken and written human language with sophisticated algorithms. This is called "text analytics" (TA). One important area of application for TA is social media (Zikopoulos et al. 2012). With text analytics tools at hand, the gathering of market information is grounded in a huge and ever-growing data set, while the process is almost completely automatic. By using unsolicited online feedback from forums, review sites, public chats, blogs, and other social media channels, web-based market and opinion research has the potential to support, enhance, and validate the traditional means of marketing research considerably and build a resilient knowledge base about the market considered (Choudhury et al. 2011).

Text analytics tools can "[…] analyze anywhere from tens of thousands of messages to tens of millions of messages" (Glance et al. 2005, p. 420). The respondents, namely the Internet users who post product reviews or other opinions and comments, do so entirely voluntarily, led by intrinsic motivation. Due to the perceived anonymity[1], people have the courage to express their true opinions and feelings. Thus, the results are more reliable and faster to obtain, and the costs are much lower.

The Internet is a channel for the exchange of opinions and views. For any imaginable topic, it is most likely that a web forum or a blog can be found. Besides debating personal matters (like hobbies or leisure time activities), many of these threads on forums discuss customer opinions and reviews of products, services, and brands as well as buying habits

[1] The anonymity may be only *perceived*, as Facebook now requires the user to us its real name, and Google connects its Google+ accounts with videos that the user uploads to YouTube.

and behaviors. This unsolicited "crowd creation" of data and information in Web 2.0 produces a large knowledge base for companies trying to obtain honest and pristine customer feedback (Leicht 2013). March (2012, 2013) states that "by choosing social media over other communication channels, millions of customers have given voice to their concerns in what has become an increasingly public arena."

By incorporating this unstructured feedback and leveraging social customer relationship management, highly customized products can be designed, additional services offered, and distribution channels and customer service improved. The whole value chain, from upstream functions such as product development, design, and production to downstream functions like marketing, sales, distribution, and after-sales service, can benefit.

2.4 Choice of market and industry for research

Derived from the argumentation above, the new opportunities for market research offered by social media and advanced TA technology are especially rewarding in areas of the world where the interest of Western corporations is high but other market research alternatives are scarce, namely emerging economies. Knowledge about the local population's preferences and opinions is crucial, but conventional means of market research do not work satisfactorily (Burgess and Steenkamp 2006). Cultural reasons play a role, for example dishonesty when filling in questionnaires or legal restrictions on foreign companies conducting market research (Ying Hon Ho 2011). The generally low participation rates can mostly only be increased by offering large monetary incentives, which are expensive and lead to validity and reliability problems like biased observation results (Bohley Hubbard et al. 2011; Juwaheer 2012). Differences in the relative importance of information

channels may also be cited; for example, Chinese consumers who are planning to purchase a car rely more heavily on electronic word of mouth (eWOM) than on advice from a representative of a local car dealer (Sha et al. 2013).

When scrutinizing the industries that would best serve as a study subject, the automotive business is conspicuous for several reasons: **First**, automotive companies, especially the German ones, are extremely reliant on the BRICS (Brazil, China, India, Russia, and South Africa) countries and the Middle East. For example, VW and BMW create about 50% of their operative profit in China, with Daimler (about 35%) trying to catch up (Freitag 2013). Additionally, four out of five luxury cars on Chinese roads were made by German manufacturers (Hirn 2013). **Second**, despite their apparent success, these players, especially Daimler, are still struggling to cater and adapt to the cultural differences of customers in emerging markets (Hawranek and Kurbjuweit 2013). **Third**, the product category "car" is ideally suited to text analytics purposes, as abundant automotive web forums are available with millions of active users/reviewers (Heiss 2010). Many users also explicitly or implicitly provide a wealth of metadata, such as authors' demographics (age, sex, social status, and income range), number and frequency of posts, geographic location of the post, IP address used, length of the post, and so on, which enable a more detailed and reliable analysis.

Additionally, as cars have a constant set of components (e.g., seats, engine, body) and features (e.g., speed, gas mileage, safety), is easier to implement them in text analytics software than, say, books, which have more "subjective" characteristics that are unique to each individual reader.

To sum up, as China is now – and will be in the future – the most important market for the automotive industry (Hirn 2013), Chinese UGC in the automotive industry served as

the primary object of the study. Owing to the encouraging results obtained in this sector, the application was then conceptually transferred to a public administration context.

3 Introduction to the Manuscripts

3.1 Overview of the manuscripts

To contribute to the abovementioned area of research, the dissertation at hand essentially consists of four research papers. The first one was presented at the IS community's most-renowned conference, the *International Conference on Information Systems*, and the second one will appear in an IS journal, namely *Information Systems Frontiers*. The third and fourth paper are similar in regard to content; the earlier version passed the desk rejection stage at *Service Science*, and the later version has been submitted to the *IFIP Conference on e-Business, e-Services and e-Society* and will appear in the *Lecture Notes in Computer Science*. Table 1 presents a detailed overview of the manuscripts included in this thesis, including further information on the publication status, co-authors, research methods, and so on. In addition, the author's research output comprises several other papers related to the field, as well as work in adjacent research areas.

As is apparent from the summary in Table 1, the common ground and recurrent theme of the manuscripts are the professional use and analysis of social media data. They are closely interrelated in looking at the subject from different angles; each paper concentrates on a different aspect thereof and focuses on making a distinct contribution to research that is not covered profoundly in the current literature.

The **first manuscript**, "A Novel Design Science Approach for Integrating Chinese User-Generated Content in Non-Chinese Market Intelligence," draws on dashboard design principles and follows a design science research (DSR) approach to develop a framework for the search, integration, and analysis of cross-language user-generated content. With *MarketMiner*, the author implements the framework in the automotive industry by analyzing Chinese auto forums. The utility, quality, and efficacy are then tested with various

means to deliver the first triangulation of the findings. Besides a novel application of design science research to construct an artifact – more accurately an instantiation – the results show a dramatic improvement of the utilization of foreign-language social media content for market intelligence purposes in a commercial context.

In the **second manuscript**, titled "Harnessing the social web to enhance insights into people's opinions in business, government and public administration," I take the programmed framework of the first manuscript one step further and transfer it conceptually to the areas of public administration and open government. Here, transparency, participation, and collaboration can be regarded as the constituting pillars. To integrate citizens and other stakeholders systematically into the policy and public value creation process, their opinions, wishes, and feedback first need to be captured or received. As a concrete area of application, the collection and analysis of social media content created mostly by Arabic-speaking refugees in the current European refugee crisis is illuminated. It is shown that the inclusion of user-generated content from social media could be a main channel for enriching this potential information base for public administrative bodies and commercial firms in the future.

Finally, in "Customer Service Experience through technology-enabled Social CRM – An exploratory analysis in the automotive industry," the focus is less on the collection and analysis of decision-relevant information but rather on the interaction of companies with their clients through social CRM, that is, interaction channels based on social media. As customers increasingly use channels like Facebook, YouTube, or forums to contact and keep in touch with firms, companies have recognized this development and anticipate gaining higher levels of customer satisfaction, customer loyalty, and customer lifetime value through the use of social media for commercial purposes. Social customer relationship management professionalizes the use of social media and supports value co-creation

for companies and their customers. In this exploratory study, we aim to discover the opportunities, pitfalls, and success factors of organizations that use technology-based SCRM to leverage customer service experience. The findings are then discussed and practical recommendations are given.

Table 1: Overview of the manuscripts included in this thesis

No.	1	2	3 & 4
Title	A Novel Design Science Approach for Integrating Chinese User-Generated Content in Non-Chinese Market Intelligence	Harnessing the social web to enhance insights into people's opinions in business, government and public administration	Customer Service Experience through technology-enabled Social CRM – An exploratory analysis in the automotive industry
Authors	Baur, Aaron W.; Lipenkova, Janna; Bühler, Julian; Bick, Markus	Baur, Aaron W.	Baur, Aaron W.; (Henne, Johannes); Bick, Markus
Outlet	*International Conference on Information Systems (ICIS, 2015)*	*Information Systems Frontiers (ISF, 2016)*	*Service Science* | *Lecture Notes in Computer Science (both 2016)*
Status	Published	Accepted	Passed desk rejection | Accepted
VHB Ranking	A	B	C | C
Points (∑=3.50)	0.75	2	0.75 + [0.50]
Research Question	• How can a market intelligence tool support the gathering, analysis and visualization of Chinese-language user-generated content for the Western automotive sector?	• How can a market intelligence tool based on user-generated content be conceptually applied to non-commercial fields, such as polity, e-government, or open-government?	• Which opportunities, pitfalls, and success factors do organizations report when using technology-based social CRM to leverage customer service experience?
Research Method	• Design science research • Dashboard design principles • Scenario analysis	• Design science research • Case study analysis	• Exploratory/qualitative: - Literature review - Semi-structured interviews
Major Contributions	• Framework for the search, integration, and analysis of cross-language user-generated content	• DSR (artifact development) • Conceptual transfer to non-profit and public administration contexts	• Literature review • Understanding of value co-creation of companies and their customers

3.2 Research questions

Following a more comprehensive explication of the background of this thesis in the previous chapters, this section briefly presents the consequent research questions of each manuscript. A detailed derivation based in the current literature can be found in each manuscript.

The widely expanded opportunities offered by advanced methods of text analytics and their use for commercial and administrative purposes have not been thoroughly studied. This deficiency inspired the first and the second manuscript. Hence, in manuscript one, we pose the following research question:

> *RQ: How can a market intelligence tool support the gathering, analysis, and visualization of Chinese-language user-generated content for Western users?*

After finishing the first manuscript, I realized that the analysis of cross-language user-generated content is undoubtedly not only beneficial to profit-oriented firms. I thus conceptually transferred the findings and process to public authorities and administrations. The derived research question may be formulated as follows:

> *RQ: How can an automated tool support the gathering, combination, analysis, and visualization of foreign-language user-generated content to increase the customer understanding and centricity of commercial firms as well as of governments and public administrations?*

Finally, the third and fourth manuscript focus on the proactive interaction of firms with their customers and ask:

> *RQ: Which opportunities, pitfalls, and success factors do companies on several vertical levels of the automotive industry report when applying technology-based*

social customer relationship management to enhance the customer service experience?

The intention is to build a better understanding of the interaction between social CRM and the intended delivery of "memorable events" (Pine and Gilmore 1999) of commercial firms when operating in a business-to-consumer (B2C) or business-to-business (B2B) context.

3.3 Research design and methods

Again, a detailed description of and reasoning for the use of the research designs and methods can be found in the respective papers. Only a short overview is given here.

Table 2: Overview of the research methods used in the four manuscripts

<table>
<tr><th colspan="3">All manuscripts</th></tr>
<tr><td colspan="3">• Automotive industry
• 11 firms with 18 contact persons
• More than 1 contact person at most companies to avoid respondent bias and to enable the first triangulation of the findings
• Purposive sampling strategy (relevance more decisive than representativeness)
• Headquartered in Germany and abroad
• Wide variety of company sizes (ranging between 120 and 600,000 employees)
• Different vertical levels of industry
- OEMs, suppliers, market research firms, consultancies
• Different departments and hierarchical levels of interviewees
- Top management | middle management | operative staff</td></tr>
<tr><th>Manuscript 1</th><th>Manuscript 2</th><th>Manuscripts 3 & 4</th></tr>
<tr><td>• Research method: design science research
• Development of artifact (instantiation) following dashboard design principles and an interdisciplinary research team using agile programming principles
• Content analysis of transcribed user requirements
• Visual requirements engineering using Mind Objects within the research team and with Master’s students
• Two Chinese social media managers formulated 16 usage scenarios that should be solved by the artifact
• After the development, the scenarios were evaluated by 2 non-Chinese social media analytics experts</td><td>• Research method: design science research, literature analysis, followed by qualitative expert interviews
• Data collection: primary data collection through expert interviews and case studies; secondary data collection using publicly available sources, such as industry reports and company documents
• Exploratory focus groups with Master’s students
• Personal or Webex conference with each lead user to discuss personal experience
• Conceptual transfer of the results to another setting (public administration) to check the external validity of the findings</td><td>• Research method: literature analysis, followed by an explorative, inductive study design
• Data collection: 18 individual semi-structured interviews (7 question blocks following an interview guideline) at the interviewee’s premises to collect primary data
• Pre-test with final-year Master’s students
• Interview duration between 45 and 96 minutes
• Data analysis: interviews were recorded, transcribed, and analyzed using an open and axial coding process with the qualitative data analysis software MAXQDA (v. 12)</td></tr>
</table>

4 Research Manuscripts

4.1 A Novel Design Science Approach for Integrating Chinese User-Generated Content in Non-Chinese Market Intelligence

Manuscript No. 1

This manuscript is published as:

Baur, Aaron W.; Lipenkova, Janna; Bühler, Julian; Bick, Markus (2015): A Novel Design Science Approach for Integrating Chinese User-Generated Content in Non-Chinese Market Intelligence. In: *International Conference on Information Systems (ICIS 2015)*, Fort Worth, Texas, December 13–16, 2015.

http://aisel.aisnet.org/icis2015/proceedings/ISdesign/4/

4.2 Harnessing the social web to enhance insights into people's opinions in business, government and public administration

Manuscript No. 2

This manuscript is accepted as:

Baur, Aaron W.: Harnessing the social web to enhance insights into people's opinions in business, government and public administration. In: *Information Systems Frontiers*.

ISSN: 1387-3326 (Print)

Manuscript available from the author upon request.

4.3 Customer Service Experience through technology-enabled Social CRM – An exploratory analysis in the automotive industry

Manuscript No. 3

This manuscript has passed the desk rejection stage as:

Baur, Aaron W.; Bick, Markus: Customer Service Experience through technology-enabled Social CRM – An exploratory analysis in the automotive industry. In: *Service Science.*

ISSN: 2164-3970

Manuscript available from the author upon request.

Manuscript No. 4

This manuscript is accepted as:

Baur, Aaron W.; Henne, Johannes; Bick, Markus: Customer Service Experience through technology-enabled Social CRM – An exploratory analysis in the automotive industry. In: *Lecture Notes in Computer Science.*

ISSN: 0302-9743

Manuscript available from the author upon request.

5 Discussion and Conclusion

5.1 Key findings and main contributions

The active participation of non-professional "authors" in the Web 2.0 environment has led to exponential growth in user-generated content. Gaining valuable insights into the opinions, needs, and attitudes of customers or citizens is of the utmost importance for market researchers, company executives, and public authorities. However, as Janssen et al. (2014, p. 44) state, "even if an organization has access to ubiquitous and cheap data, its ability to make use of and synthesize data from various sources will likely determine its success going forward." We therefore reasoned that a framework is needed for cross-platform/cross-source linking, combination, storage, analysis, and display to employ user-generated content as a basis for better decision making (Gelman and Wu 2011; Jones 2011).

In addition to improved means of analysis, companies apply social customer relationship management to interact better with their clientele and gain higher levels of customer satisfaction, customer loyalty, and customer lifetime value.

In the following section, a summary of the findings and main contributions of the manuscripts of this thesis is presented.

In **manuscript one** we follow the design–build–evaluate guideline of design science research set out by Hevner et al. (2004) to conceptualize and develop a social media analytics framework. We contribute to the extant body of knowledge by advancing the search and analysis support of multi-language social media content across different Web 2.0 formats. The instantiated IT artifact *MarketMiner* enables the effective and efficient analysis of Chinese-language customer product feedback, sentiment, preferences, and market

trends. Through a very detailed bilingual industry ontology, the analysis output is displayed entirely in English. As this framework is generic, it can easily be altered to build solutions for other knowledge domains. The expert evaluations, scenarios, and case studies demonstrate that *MarketMiner* enables professionals to gain unprecedented awareness of formerly mysterious foreign-language markets.

The framework was evaluated through expert appraisal and use case/scenario analysis as well as being tested productively in eleven companies on four different vertical levels. The results suggest that tools like *MarketMiner* can help companies to become closer to customers, to receive their feedback, and hence to create better and more successful products. According to our sample, some of the interviewees could indeed take their first looks at new markets and target groups as they gained “a grasp on [our] Chinese customers” or figured out “key aspects” that they or their customers “were not aware of.” Eventually, this increased level of insights also leads to lower costs and higher market success of manufacturers. Fully developed market intelligence tools can overcome major challenges, for example the handling of the large amount of data created every day or the variety of formats and structures of social media content, and thus can boost efficiency. The user impressions support this assertion by emphasizing the competitive advantage of “advanced technology,” which can be “crucial” when traditional data warehousing technologies might fail. This is especially true for analyses of high quality, which seem to be less precise using the traditional “social media monitoring tools” currently in use.

Finally, our respondents were able to save time while conducting their daily market research, especially in terms of language barriers. Even though English is the most widespread business language, the majority of Internet users worldwide do not use English as their means of (online) communication. Understanding and using that non-English content productively is therefore difficult. For *MarketMiner* in particular, the conversion

from Chinese to English was seen as useful because of the ability to report local activities on the Chinese market to foreign headquarters and "to support the local market research activities." However, even for native Chinese people, the tool was effective and "saved them much time and hassle." Still, the need for "accuracy" was and always has to be fulfilled by the instruments to gain customers' confidence, such as in precarious scenarios of "non-obvious product flaws".

Overall, there was consensus that it was useful for solving the identified problem, had a high data analysis quality, and had a high degree of efficacy for reaching the stated goals. With *MarketMiner* and the underlying framework, we have displayed significant novelty *and* utility, as demanded from DSR research outputs (March and Storey 2008). We have contributed by reasoning, proof-of-concept, and proof-of-acceptance and use (Davis 2005). This gives an indication that natural language processing technologies have advanced far enough to support humans in the collection, analysis, and sense-making of large amounts of text.

In **manuscript two** the ideas, methods, and insights of the above-mentioned framework are transferred to the public sector context, especially in the light of the current challenges of a high number of political refugees entering the European Union. The influx of millions of Arabic-speaking migrants challenges public authorities in understanding people's needs, worries, and issues. However, understanding is the first step to remedy. *MarketMiner* can mitigate this knowledge gap. With a profound information base, more citizen-centric politics, more efficient and effective service provision processes, and the efficient allocation of notoriously limited municipality funds may become a little easier (see also Chen and Chu 2012).

We analyze how social CRM can interact with and benefit the customer service experience in **manuscripts three and four**. Our study adopts an inductive, explorative stance

with qualitative interviews as the method of data collection and coding as the means of data analysis. It expands the body of research in the service science field from an IS academic viewpoint by answering the question of which opportunities, drawbacks, and success factors companies on several vertical levels of the automotive industry report when applying technology-based social customer relationship management to enhance the customer service experience.

As customers have a greater number of choices than ever before, more complex choices, and more channels through which to pursue them, companies need to focus on delivering an excellent customer service experience (Sheth et al. 2001). Spreading important clues that address all five senses of the customer, that is, seeing, smelling, tasting, hearing, and touching, can at least partially be supported through social CRM methods (Berry and Carbone 2007; Ding 2011). However, many companies just seem to follow the trending social media path like everyone else without adding significant elements to their overall business model (Boulding et al. 2005). They have not realized until now how to integrate social media services into their strategic concept to differentiate themselves and create unique selling propositions (Kotler and Keller 2011) as well as igniting value co-creation (Akaka et al. 2014).

The rapidly developing and changing social media environment and the hitherto changing relationship between companies and their customers can be regarded as the rationale for conducting this study (cf. also Haenlein and Kaplan 2012). As more and more power shifts from companies to customers, new concepts, technologies, and recommendations have to be created and provided (Ordenes et al. 2014). This explorative approach with the first empirical elements helps to set the research agenda for upcoming studies. It identifies companies' approaches to enhancing the customer service experience using social CRM.

5.2 Implications for research and practice

Due to the lack of existing research in the addressed areas, the approaches in all four manuscripts took an explorative stance.

In papers one and two, the conceptualized and instantiated artifact is tested using qualitative means of evaluation. As discussed in the literature review sections in the respective manuscripts, there is a lack of artifacts that are empirically grounded in practical necessities and that have been diligently developed following the accepted DSR principles and theoretical considerations.

This research has several important implications for academics who are interested in analyzing social media content. **First**, the results demonstrate that the use of an integrated portal is an effective and efficient means of aggregating large volumes of product feedback, customer opinions, and market developments (Kurniawati et al. 2013). Without such a system, researchers need to browse an array of sites and familiarize themselves with various different structural formats. **Second**, translation support is vital due to the multitude of languages used online today. To that end, the framework delivers both concept mapping for the transference of foreign-language terms to their respective counterparts in English and real-time support to translate the underlying customer posts from Chinese to English via Google Translate. **Third**, the large amount of user-generated content available on the Internet in Chinese requires a combination of complete and incremental crawling or spidering. Therefore, our artifact includes a daily routine that automatically updates the data repository with any new forum entries from the last 24 hours. This responsiveness provides opportunities for detecting approaching threats (such as product quality issues) and monitoring the effectiveness and impact of marketing campaigns. Over the market economy or society as a whole, the results of a deeper, user-generated, and intimate knowledge of customers can lead to better but cheaper products,

less waste, and a greater consumer and producer surplus (Homburg 2015). Applying these social media analytics technologies to a public administration context can lead to more citizen-centric politics and more efficient and effective service provision processes (Chen and Chu 2012). Here, research colleagues from disciplines such as political economy, public management, public policy, or security policy should pick up the research and apply and further advance it.

The sole fact that unsolicited customer feedback has become widely available offers practitioners in firms great opportunities but also responsibilities. Through the use of additional customer and market insights, they can constantly improve their products and services and tailor them more closely to the taste of their customers. However, these new technological opportunities also exert enormous pressure on the companies and their IS and knowledge management (KM) systems. Ignoring the developments will quickly put them at a competitive disadvantage, since their competition now has the same new sources of information and will most likely use them (competitive pressure). The implications offered by this dissertation regarding how to use the new data in the most effective manner will therefore benefit departments along the whole corporate value chain. As both research and practice will benefit, we have answered the call for both rigor and relevance in IS research (e.g., Österle et al. 2011; Straub and Ang 2011).

5.3 Overall limitations and further research

Naturally, several limitations are present in the underlying manuscripts, which we would like to address.

First, only the language pair of Chinese–English was developed and tested. Chinese indeed has certain particularities that make it rather special when it comes to natural language processing (Fan et al. 2013; Fang et al. 2013). Therefore, the transferability of the

findings to other languages needs to be cross-checked. The modular framework of the artifact generally makes it possible to replace the lexica and natural language processing algorithms to test its quality and utility for other cross-language applications.

Second, a hypothesis-driven, quantitative evaluation of the artifact was not possible, because of the lack of an appropriate benchmark. Even though it is possible to generalize in IS using qualitative research methods (Conboy et al. 2012; Lee and Baskerville 2003), subsequent quantitative studies with a large user base could adopt a standardized survey form to evaluate ease of use, utility, task performance, and so on. These additional proof-of-use and proof-of-value analyses (Nunamaker and Briggs 2011), along with valid statistical and longitudinal measures, would further strengthen the validity of the preliminary findings presented in this work (Recker and Rosemann 2010).

Third, the framework in its current form only captures textual semi-structured and structured content from a limited number of sources, namely forums with relatively long posts. It is not currently clear whether an expansion to include more diverse sources, sources that potentially have shorter posts, or a structured combination and analysis of multimedia content, such as pictures or video files, would yield additional value and deliver the same positive results.

Finally, as is common with qualitative research, the number of data points gathered was limited. Eighteen interviews from eleven firms are considered appropriate (Benbasat et al. 1987), but to verify the external validity of the findings, repeating the studies in other contexts would prove whether the same or similar results would be achieved. Cultural aspects were also not taken into consideration, as a thorough examination of cultural differences and their effect on social media based NLP is worth a dissertation on its own. In addition, the research was undertaken completely in the automotive industry, which can be regarded as being very mature with few dynamics. Questions of external validity, that

is, whether the results can be transferred to other, potentially more dynamic industries, remain unacknowledged.

Future studies could address the abovementioned limitations and further advance the validity and reliability of the results. Some suggestions may include the following ideas.

First, the reproducibility of our results in other target industries (e.g., fast-moving consumer goods (FMCG), electronics, white goods, pharmaceuticals, banking) and commercial contexts should be checked. These may be other physical products but also service industries. This would enable a thorough check of the external validity of the developed framework.

Second, as mentioned above, the transfer of the framework to public administrations, governments, non-profit organizations, or non-governmental organizations (NGOs), which was performed conceptually done in manuscript two, should be tested empirically. Here, the potential impact on the quality of the public services offered and the satisfaction of the citizens in the relevant district is of high scientific relevance and societal value. A change of perspective, that is, considering the issue from the other side, the customers' point of view, could also bring new research impetus and triangulate the findings.

Third, other source and target language pairs besides Chinese and English should be studied. Other emerging market languages, like Arabic, Hindi, Portuguese, and Russian, may be of the greatest interest.

Fourth, the focus could be shifted to investigating whether automated detection and analysis of trust mechanisms such as "opinion leaders" (bloggers or YouTuber who have hundreds or thousands of followers and who therefore have a high impact on other users) are feasible (Chang et al. 2014; Sherchan et al. 2013).

Fifth, research into the *kind of data* may prove to be fruitful, for example concerning which online sources are most appropriate for which kind of information requirements (e.g., publicly available sources with unsolicited feedback such as social networks, microblogs, shopping platforms, newsgroups, and expert forums (Duan 2013; Duan et al. 2008) as opposed to non-public sources with unsolicited feedback (e.g., call center transcripts, email support records, complaint letters) and non-public sources with solicited feedback (e.g., replies to post-purchase shop evaluation requests)). Expanding the research framework to include unstructured visual content (photo and video images from social multimedia sites) would also be a promising avenue.

Sixth, a direct comparison of traditional and innovative means of marketing, measured in effectiveness, efficiency, and type of relevant output data, may be considered.

Finally, making a huge technological leap, the framework should be expanded to include a real decision support system, that is, a system to interpret the results of the UGC and formulate the strategic alternatives that unfold from them (Arnott 2004, 2010). This interpretation would yield great additional value to the users.

5.4 Final remark

The increasing globalization and ubiquity of the Internet calls for more relevant and rigorous research that crosses traditional geographical and disciplinary boundaries to research pervasive phenomena. The international focus of the ESCP Europe Business School Berlin in general and the PhD program in particular have always motivated me to study issues that relate to more than one national or cultural, but also disciplinary context. With the present thesis researching cross-language user-generated content in the field of business information systems in a variety of settings, I was able to satisfy this longing.

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