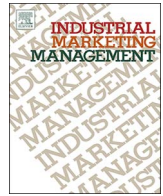




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## Digital, Social Media, and Mobile Marketing in industrial buying: Still in need of customer segmentation? Empirical evidence from Poland and Germany

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## ABSTRACT

This study investigates the necessity of customer segmentation in industrial buying regarding Digital, Social Media, and Mobile Marketing (DSMM) from the perspective of a German sensor supplier. First, we conduct a systematic literature review, extracting 37 articles in which our team of researchers jointly with a team of sales representatives of the supplier identify five changes in information behavior associated to customer segmentation: Increasing requirements for information, increasing number of sources, increasing information demands regarding data security and use of mobile devices as well as social media in industrial buying. Thereupon, we address the research question with an empirical study. Our sample includes 139 industrial enterprises from Poland and Germany, which purchase sensor technology from a common German supplier. We test the impact of the buying frequency, the function of the person buying, the industry sector and the country of origin on the perception of the five developments identified in our literature review related to DSMM. Based on these findings, we derive strategies for customer segmentation associated to DSMM in industrial buying.

## 1. Introduction

Digital, Social Media, and Mobile Marketing (DSMM) describes an ongoing major transformation in marketing. It condenses several technological developments affecting marketing research and practice (Lamberton & Stephen, 2016). In B2B contexts, DSMM usage remains scarce, mainly aiming for aspects such as brand image rather than being implemented in industrial information search and purchasing, yet presenting considerable potentials (Järvinen, Tollinen, Karjaluoto, & Jayawardhena, 2012; Michaelidou, Siamagka, & Christodoulides, 2011; Strong & Bolat, 2016). Information search and purchasing, often summarized as buying behavior, are essential activities of industrial firms (Van Weele, 2004). In industrial buying, information search describes the action conducted by the buyer in order to obtain all relevant information sources for the buying decision, often involving the consideration of data from different origins (Bunn & Clopton, 1993). Industrial buying behavior is characterized as a complex process with multiple dimensions (Johnston & Lewin, 1996) and phases (Brossard, 1998). In B2B contexts, information search and purchasing normally are more formalized than in B2C contexts, for example resulting in buying centers with multiple buyers (Webster & Wind, 1972). In context of DSMM, distinct differences delineate B2B and B2C usage (Moore,

Hopkins, & Raymond, 2013; Swani, Milne, Prown, Assaf, & Donthu, 2016; Swani, Prown, & Milne, 2014). The factors influencing industrial buying are evolving constantly, as reflected by emerging information technologies or cultural developments (Hertweck, Rakes, & Rees, 2009; Wiersema, 2013). Since such alterations are expected especially through DSMM (Lamberton & Stephen, 2016), the present paper addresses the following research questions:

1. Which changes in buying behavior result from the usage of DSMM in B2B contexts?
2. Which factors influence these changes, resulting in valid criteria for customer segmentation for DSMM?

Therefore, this study addresses four aspects which have been comparably seldom regarded in present research. First, no systematic literature review of DSMM in context of industrial buying has been published so far. Alejandro, Kowalkowski, da Silva Freire Ritter, Marchetti, and Prado (2011) state that many studies address sub-categories in this field, but do not present a systematic overview. Thus, we intend to provide a systematically derived overview of research articles investigating DSMM in B2B contexts. Second, criteria for customer segmentation in DSMM have scarcely been regarded in B2C as

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**Table 1**  
Journal distribution ( $n = 37$ ).

Journal name	2008–2010	2011	2012	2013	2014	2015	2016	Total
<i>Industrial Marketing Management</i>	1	1		1	1	1	11	16
<i>Journal of Business &amp; Industrial Marketing</i>			1			4	1	6
<i>Journal of Customer Behaviour</i>			2				2	4
<i>American Journal of Business</i>			1					1
<i>California Management Review</i>					1			1
<i>Computers in Human Behavior</i>					1			1
<i>European Business Review</i>						1		1
<i>International Journal of Business Communication</i>						1		1
<i>Journal of Interactive Marketing</i>							1	1
<i>Journal of Internet Commerce</i>				1				1
<i>Journal of Organizational Computing and Electronic Commerce</i>		1						1
<i>Journal of Personal Selling and Sales Management</i>			1					1
<i>Journal of Research in Interactive Marketing</i>								1
<i>Marketing Management Journal</i>			1			1		1
Total	1	2	6	2	4	7	15	37

The detailed list of articles can be obtained from Table A.1 in the Appendix A.

well as in B2B contexts (Lamberton & Stephen, 2016). Third, the majority of studies concerning industrial buying behavior have been conducted in Anglo-American countries (Alejandro et al., 2011). Germany represents a major market and supplier for the manufacturing industry worldwide, Poland an emerging industrial nation with large potentials. For both Poland and Germany, manufacturing industries play an essential role in the economy (World Bank, 2017). Yet, little research in B2B marketing has been conducted in these two countries, which provides us with a motivation to study them in this research. Fourth, we analyze a homogenous group of companies, which all share a single supplier of sensor technology, representing a comparable information and purchasing environment among the buyers. The buying situation could be different when conducting a survey among buyers in which several suppliers are considered by each of them. Especially for the aspect of customer segmentation, it is relevant to exclude this potential influencing factor.

This paper is structured as follows: First, we present a systematic literature review of DSMM in B2B marketing, illustrating five main research streams. Second, we provide a research model that is based upon the systematic literature review and derived jointly with nine sales representatives of a German sensor supplier. Further, five main research hypotheses are derived. They are subdivided for four main influential factors on buying behavior. Third, the research methodology is described, including the sample and constructs used in our model. Subsequently, we present the findings of the study, testing the hypotheses with data obtained from our sample. Finally, managerial as well as research implications and present future research propositions are illustrated.

## 2. Literature review

### 2.1. Selection of articles

In their literature review regarding DSMM, Lamberton and Stephen (2016) do not mention any articles primarily related to industrial buying or B2B marketing. However, their literature review only focuses on five marketing journals. To the best of our knowledge, no systematic literature review of changing information behavior related to DSMM in industrial buying has been published so far. A systematic literature review represents a well-established, transparent, and replicable method for the identification, evaluation, and synthesis of existing publications with an elaborate and well-defined process (Fink, 2013; Tranfield, Denyer, & Smart, 2003).

Regarding the timeframe of our literature review, we chose articles from 2000 to 2016, thereby representing the same timeframe as conducted by Lamberton and Stephen (2016), adding the articles published

in 2016. The publications were obtained by searching in five major databases: ABI/INFORM, ProQuest, Scopus, Business Source Complete (EBSCO), and ScienceDirect. The databases are internationally accessible and were chosen in several literature reviews published in high-quality journals. The keywords used were:

Digital (OR) Social Media (OR) Mobile  
(AND)

B2B Marketing (OR) Business-to-Business Marketing (OR) Industrial Buying (OR) Industrial Purchasing

We searched for these keywords in title, abstract and keywords. The publication types chosen were academic, peer-reviewed publications. We furthermore excluded several articles out of scope for our literature review, such as articles with primarily technical background or a major focus on DSMM in B2C marketing. Primarily, research articles published in marketing journals were selected. Additionally, we included articles from business and management as well as social and psychological disciplines related to marketing.

Our final selection of relevant literature includes 37 articles from 19 academic journals. Regarding the journal distribution, 26 out of 37 articles are found in *Industrial Marketing Management*, *Journal of Business & Industrial Marketing*, and *Journal of Customer Behaviour*. Sixteen articles are derived from *Industrial Marketing Management*, 11 from its special section ‘Social media and social networking in industrial marketing’ from 2016. Further eleven articles were found in eleven different journals. We additionally grouped the articles in seven publication periods. As no publications were identified between 2000 and 2007 and only one between 2008 and 2010, we formed the years between 2008 and 2010 into a first publication period. The remaining six publication periods each include one year from 2011 to 2016. Thereby, we find that 26 out of 37 research articles were published between 2014 and 2016. We conclude that DSMM in B2B contexts represents a contemporary topic in marketing research. Its main publication period seems to have begun several years after DSMM-related articles in general. Table 1 shows the complete journal distribution of the 37 articles extracted resulting from the literature review.

### 2.2. Review process

For further model development, the 37 articles were analyzed regarding the research objective, data collection method used and main results. Four articles are literature-based conceptual work, whereas five articles perform content analyses, i.e. social media content. Case studies, mostly based on interviews are found 14 times, whereas surveys also occur 14 times.

In a next step, two authors, who independently read all 37 articles, identified main research topics, hypothesis, method and results of the

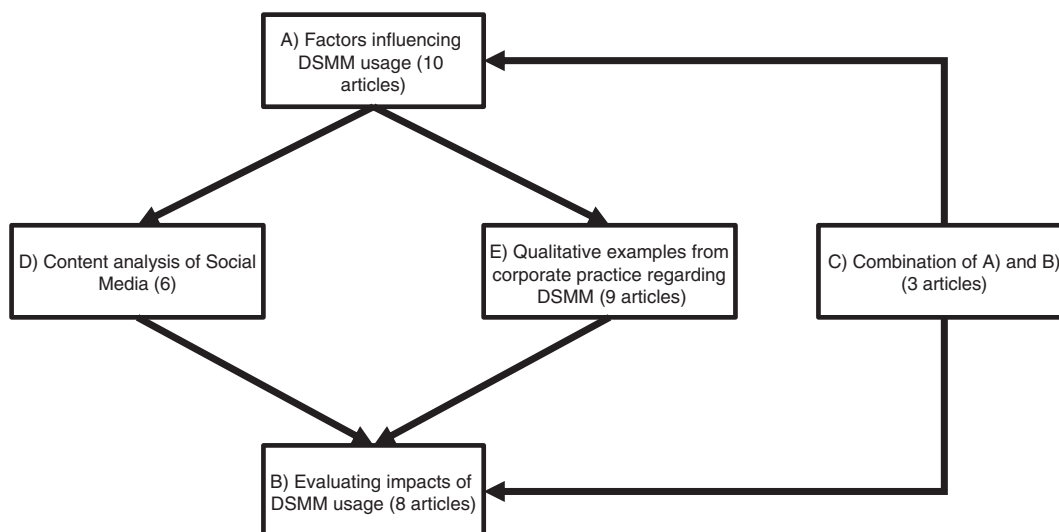


Fig. 1. Framework of research streams.

articles analyzed. In a following discussion with the third and fourth author, we condensed methods, findings and themes. The detailed distribution of method and categorization is shown in Table A.1 in the Appendix A. As a result, we identified four main research streams in current literature concerning DSMM in B2B contexts and a fifth one that combines two of those.

#### 2.2.1. Factors influencing DSMM usage (10 articles)

This first research stream concerns the factors that lead to or prevent Social Media usage in B2B contexts. In this group, eight articles are based on empirical surveys (Guesalaga, 2016; Järvinen et al., 2012; Keinänen & Kuivalainen, 2015; Lacka & Chong, 2016; Michaelidou et al., 2011; Veldemann, Van Praet, & Mechant, 2015; Wang, Hsiao, Yang, & Hajli, 2016). Only Siamagka, Christodoulides, Michaelidou, and Valvi (2015) employ an empirical survey as well as interview results, but primarily base their findings on the empirical survey, which is further validated with expert interviews. Thus, the research method has been coded as survey. Further, Lacoste (2016) employs the results of a case study, whereas Habibi, Hamilton, Valos, and Callaghan (2015) develop a framework of research propositions based on literature analysis. All ten articles solely describe examples of Social Media in B2B contexts. From further analysis of the articles, it can be concluded that only Siamagka et al. (2015) as well as Lacka and Chong (2016) investigate the perspective of customers that are provided with Social Media content. All other papers based on surveys or case studies regard the perspective of companies acting as potential providers of Social Media content.

#### 2.2.2. Evaluating impacts of DSMM usage (8 articles)

In this research stream, four articles evaluate the outcomes that result from DSMM in B2B contexts. Most often, this includes quantifiable data, such as customer satisfaction or sales performance. Four articles mainly focus on social media, from which two are survey-based (Agnihotri, Dingus, Hu, & Krush, 2016; Rodriguez, Peterson, & Krishnan, 2012) and two are based on literature analysis (Singaraju, Quan, Niininen, & Sullivan-Mort, 2016; Sood & Pattinson, 2012). Wang, Pauleen, and Zhang (2016) as well as Karjaluo, Mustonen, and Ulkuniemi (2015) employ the results of case studies. Two further articles evaluate the outcomes of mobile technologies in B2B marketing. Bolat (2016) uses interview results, whereas Lee and Park (2008) derive their results from an empirical survey.

#### 2.2.3. Combination of A and B (3 articles)

A third research stream combines factors that lead to or prevent

Social Media usage as well as its outcomes. All three articles in this third group are survey-based (Jussila, Kärkkäinen, & Aramo-Immonen, 2014; Moore et al., 2013; Schultz, Schwepker, & Good, 2012).

#### 2.2.4. Content analysis of Social Media (6 articles)

In this research stream, six articles perform a content analysis of social media posts and contributions (Brennan & Croft, 2012; Leek, Canning, & Houghton, 2016; Mehmet & Clarke, 2016; Rooderkerk & Paulwels, 2016; Swani et al., 2014, 2016).

#### 2.2.5. Qualitative examples from corporate practice regarding DSMM (9 articles)

Finally, a fifth research stream describes examples from corporate practice when employing DSMM in B2B marketing. Six articles present the results of case studies (Bernard, 2016; Huotari, Ulkuniemi, Saraniemi, & Mäläskä, 2015; Järvinen & Taiminen, 2016; Katona & Savary, 2014; Salo, 2012). Further, two articles are based on case study research that investigates the role of branding in the context of DSMM (Lipiäinen & Karjaluo, 2015; Strong & Bolat, 2016). Garrido, Gutiérrez, and José (2011) present findings from their survey results, which are mainly presented in a descriptive manner and mainly refer to usage in corporate practice. Wiersema (2013) condenses findings from corporate and practice literature into a research framework, whereas Holliman and Rowley (2014) employ 15 interviews from corporate practice to develop a grounded theory of content marketing.

We condensed these five research streams into a framework that is shown in Fig. 1.

### 3. Model development

In order to increase practical relevance of academic research in the B2B marketing discipline (Brennan, Tzempelikos, & Wilson, 2014), we further developed the research model with nine representatives of the marketing department from the sensor supplier regarded. Against the background of developing a model for customer segmentation in DSMM from the perspective of a supplier, we could not find a model which could be used or modified. However, the results of the literature review could be used in order to develop, confirm and refine the process to create a research model, which is described in the following.

In a first step, these nine representatives were interviewed independently from each other, responding to two interview questions:

1. Which changes in information behavior do you expect from customers regarding DSMM?

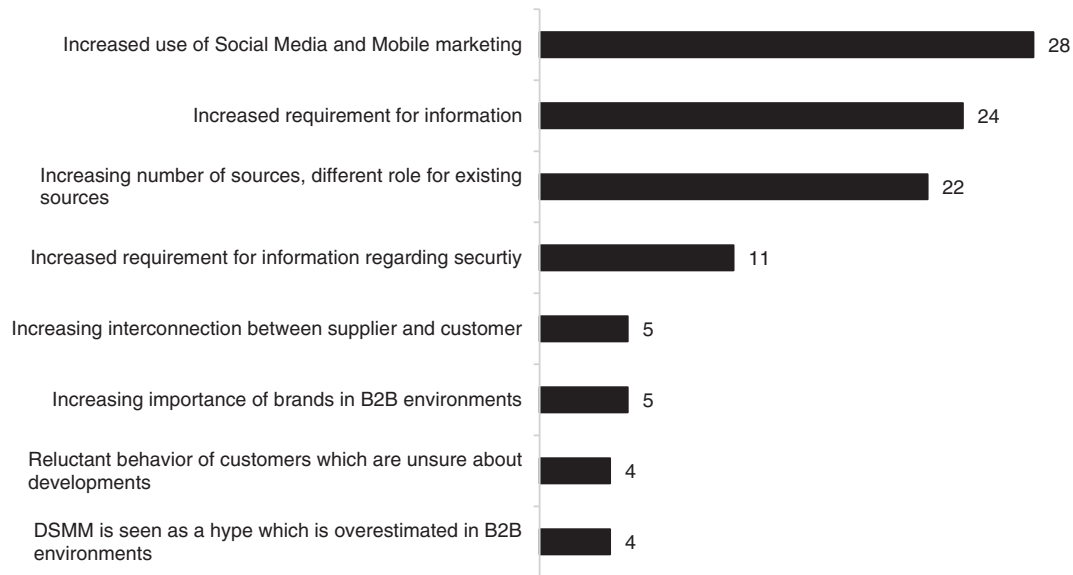


Fig. 2. Interview results: Expected change in information behavior of customers regarding DSMM ( $N = 103$ ).

## 2. Which factors for customer segmentation do you consider appropriate regarding DSMM?

After conducting the interviews, we used qualitative content analysis in order to identify and interpret common patterns, themes, and categories (Miles & Huberman, 1994). The inductive coding procedure helped new knowledge to emerge (Krippendorff, 2013). The coding process was conducted together by three authors to increase methodological rigor (Weston et al., 2001). After completing the coding process, we derived 103 codes. In a next step, we used frequency analysis for developing the codes into eight main categories (Holsti, 1968). Fig. 2 illustrates the results of question 1, the changes in future information behavior related to DSMM. The numbers given next to the bars represent the sum of codes in the respective category named by the nine respondents, adding to the total number of 103 codes throughout the eight categories.

In a common workshop with interviewees and the authors, it was agreed to focus on the four developments named foremost in the study. Increasing interconnection between supplier and customer was rather regarded as an enabler than an outcome regarding information behavior. Due to the divisional structure with several different brands of the sensor supplier regarded, developments regarding industrial brands were also excluded. Last, reluctant or skeptical attitudes towards DSMM were not included as a distinct change of information behavior through DSMM, but an evaluation that respondents should express when answering the questionnaire.

To compare the four developments with the findings from the literature review, we analyzed the 37 research articles for the occurrence of those four developments. As the interviewees regarded Social Media and Mobile Marketing as a close interconnection whereas literature separates those two developments, we also decided to distinguish between those two changes in information behavior. We found that among the 37 articles identified in our literature review, 20 cover the topic of increasing use of Social Media of industrial customers, whereas seven articles investigate increased usage of Mobile Marketing of industrial customers. Six articles investigate increasing information requirements, seven articles especially focus on information regarding security and finally, eleven articles discuss an increasing amount of sources used by customers. Several of the 37 articles regard more than one of these changes in information behavior. Further, each of the 37 articles found in the systematic literature review covers at least one of the five changes in information behavior derived from sales

representatives' opinions. Therefore, we argue that the empirical findings from the interviews with sales representatives from the sensor supplier regarded can be reasoned from current literature. This leads to five changes in information behavior through DSMM that are further regarded in this study.

Together with the nine sales representatives, we formulated these five changes in information behavior and put them in the following order that was deemed logical for the survey intended for the company's customers. As a timeframe, the sales representatives and the authors agreed on five years, attempting to establish an explorative investigation of changes in information behavior that DSMM could cause.

- 1) The amount of required information will increase.
- 2) The number of sources used for information search will increase.
- 3) The importance of information for data security will increase.
- 4) Industrial Buying with mobile devices will increase.
- 5) The usage of social media for information search will increase.

Regarding factors for customer segmentation, the nine sales representatives named the following factors with an equal share for each one: Demographics and function of the buyer, frequency of buying and buying risk, as well as the industry sector. To compare this evaluation with literature, we investigated controls and influential variables that can be used for customer segmentation. We used the 14 research articles which employ surveys as their method, since the other research methods used in the 23 further research articles did not provide clear evidence for potential factors applicable for customer segmentation. As a result, the following controls or influential variables were found: personal factors and function of the buyer (14), buying risk and frequency of buying (3), industry sector (3), company size (3), corporate culture (1), and B2B to B2C comparison (1). In accordance with the sales representatives, personal factors were excluded as revealing such factors in a survey from a customer to a supplier had not been successful in the past. However, this influential factor should definitely be incorporated in future studies that are conducted within an organization and not from a supplier to its customers. Still, for investigating market segmentation from a suppliers' perspective, we find it reasonable that this segmentation factor cannot be regarded in a customer survey. For the same reason, corporate culture was not included, still representing an important influential factor that we suggest for further investigation, but not suitable for the purpose of this study. Further, we did not include company size due to the anonymity that is typically requested by



respondents, as remarked by the sales representatives. As for B2B to B2C comparison, this paper focuses on B2B contexts and the company regarded only has B2B customers. Therefore, this investigation uses buying frequency, function of the buyer as well as industry sectors as potential influential factors for customer segmentation. These factors have already been regarded in past investigations of industrial buying, as explained in the following.

As noted by Johnston and Lewin (1996), a general influence of frequency of buying on information behavior has been the subject of several investigations. When customers are experienced in buying, buying becomes a frequent process (Aarikka-Stenroos & Makkonen, 2014; Leonidou, 2005; Robinson, Faris, & Wind, 1967). Higher buying frequency leads to higher buying risk perceived, which can be addressed by augmented information effort (Darby & Karni, 1973; Johnston & Lewin, 1996; Nelson, 1970; Newall, 1977). Furthermore, high buying frequency from one supplier can be seen as using heuristics to approach buying risk (Wilson, McMurrian, & Woodside, 2001). This paper therefore regards buying frequency as an important influential factor on information behavior and applies the construct of buying frequency by Johnston and Lewin (1996). The type of information required in B2B contexts can be differentiated for distinct functions within an enterprise or buying center (Lewin & Donthu, 2005; Moriarty & Spekman, 1984). Furthermore, the personal characteristics of the decision maker influence the information process, and so do social influences (Bonoma & Johnston, 1978). For example, engineering or manufacturing functions possess a higher need recognition than marketing, purchasing or management (Garrido-Samaniego & Gutiérrez-Cillán, 2004). Furthermore, McQuiston and Dickson (1991) find that personal commitment in information behavior rises when direct benefits through purchase decisions are present. This can be differentiated for functions that are primarily concerned with buying or if buying maintains a secondary function, where the buyer directly uses purchased products. Dawes, Lee, and Dowling (1998) find that with rising influence within the buying process, commitment in information behavior rises. Also, the decision-making process undertaken by buyers influences the information process, as found by various studies (Garrido-Samaniego & Gutiérrez-Cillán, 2004; Juha & Pentti, 2008; Lewin & Donthu, 2005). We therefore utilize the function of the buyer as an influential factor on buying behavior in DSMM. Lewin and Donthu (2005) as well as Newall (1977) confirm the industry sector to have different influences on information behavior in B2B contexts. We therefore regard the distinction of industry sectors to have high relevance for the adaptation of B2B marketing to DSMM in order to satisfy different customer expectations. As a result, we apply different industry sectors as a further form of customer segmentation within our research model. As a fourth factor for customer segmentation, the authors decided for a comparison between the different national markets, as different countries possess cultural and structural differences in industrial buying (Alejandro et al., 2011; Bonoma & Johnston, 1978). Especially regarding the developments regarding the Industrial Internet of Things, differences between countries can be expected (Bauer, Hämmerle, Schlund, & Vocke, 2015; Müller, Buliga, & Voigt, 2018). The underlying research model is illustrated in Fig. 3.

In the following, we develop hypotheses for each of the four factors of customer segmentation and the five changes in information behavior in DSMM.

## 4. Hypotheses

### 4.1. Required information

When higher buying risk, often represented by buying frequency, is present, intensified information effort can be seen (Bunn & Clopton, 1993; Garrido et al., 2011; Johnston & Lewin, 1996). For example, when the buying risk is regarded as high, buying centers with increased complexity exist (Garrido-Samaniego & Gutiérrez-Cillán, 2004; Lewin &

Donthu, 2005). Especially for complex information, high efforts in terms of information search are made, among them using personal contacts in addition to further sources (Bowman & Lele-Pingle, 1997; Dawes, Dowling, & Patterson, 1992; Garrido et al., 2011).

Edmunds and Morris (2000) find that information technologies, especially the internet, increase the degree of detail required within buying behavior in B2B contexts. Stone and Woodcock (2014) support this view, finding that required knowledge about customers and suppliers will increase in particular concerning its degree of detail. Examples of increased information requirements in DSMM encompass information exchange between several levels of communication and with higher frequency, also including contact to B2C customers via B2B partners, also known as ‘B2B2C’ (Holliman & Rowley, 2014; Rapp, Breitelspacher, Grewal, & Hughes, 2013). Other forms include content marketing with increased interaction for different functions within an enterprise, which leads to an increased requirement for information (Huotari et al., 2015; Lipiäinen & Karjaluto, 2015). Increased information requirements may also be foreseen as augmented complexity of information search is expected for the future in B2B contexts (Garrido et al., 2011; Jackson & Farzaneh, 2012). Further complexity and a following requirement for information will require expertise for different functions of buyers within an enterprise (Bernard, 2016; Habibi et al., 2015; Leeflang, Verhoef, Dahlström, & Freundt, 2014). This leads to the following hypothesis:

**H1a.** Buying frequency correlates positively with information requirements in DSMM.

**H1b.** The function of a buyer affects information requirements in DSMM.

**H1c.** The industry sector affects information requirements in DSMM.

**H1d.** The country affects information requirements in DSMM.

### 4.2. Number of sources

In general, the number of information sources utilized is positively related to the frequency of buying (Homburg & Kuester, 2001; Hunter, Kasouf, Celuch, & Curry, 2004; Johnston & Lewin, 1996; Moriarty & Spekman, 1984). Risk reduction is seen here as utilizing multiple sources for triangulation of information, also called ‘hedging’ (Cooper, Wakefield, & Tanner, 2006). Multiple sources are used especially when the buying risk is high, often additionally involving the use of personal communication (Brossard, 1998; Henthorne, LaTour, & Williams, 1993). Garrido et al. (2011) find that the Internet in particular will function as a new source of information when searching for complex contents.

Especially technology-based information search and purchase via the Internet is expected to gain importance in B2B marketing (Harrison-Walker & Neeley, 2004; Järvinen & Taiminen, 2016; McMaster, 2010; Wiersema, 2013). New sources include digital content marketing in B2B contexts, encompassing multiple formats of communication, such as interactive application examples (Keinänen & Kuivalainen, 2015) or product videos with individualized, interactive, and problem-solving content (Holliman & Rowley, 2014). This will lead to new ways of interaction and communication (Katona & Savary, 2014; Mehmet & Clarke, 2016; Sood & Pattinson, 2012). Furthermore, Social Media itself can be seen as a new source of information (Huotari et al., 2015; Järvinen et al., 2012). All these information sources will require especially trained personnel for provision of content as well as for buyers (Leeflang et al., 2014). Holliman and Rowley (2014) also expect multiple sources to be used for information search in the future in different industry sectors, as adoption can be differentiated for functions (Garrido et al., 2011; Keinänen & Kuivalainen, 2015) or industry sectors (Veldemann et al., 2015). Relating to these findings, we propose the following hypothesis:

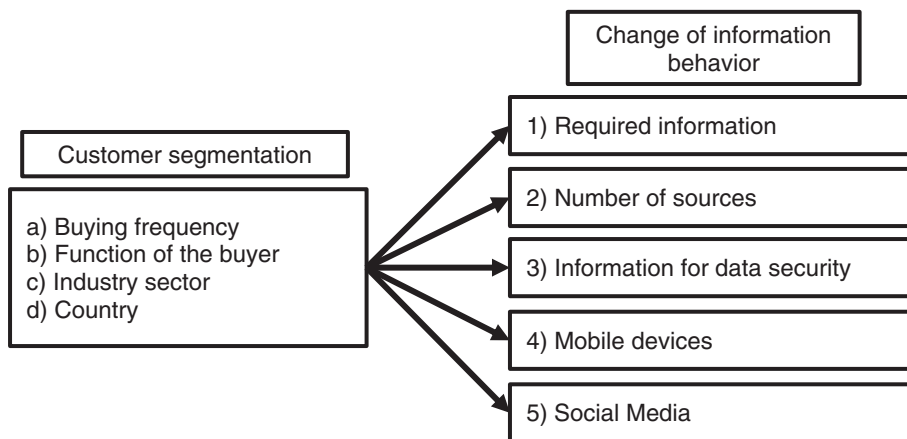


Fig. 3. Research model.

**H2a.** Buying frequency correlates positively with the number of sources in DSMM.

**H2b.** The function of a buyer affects the number of sources used in DSMM.

**H2c.** The industry sector affects the number of sources used in DSMM.

**H2d.** The country affects the number of sources used in DSMM.

#### 4.3. Information regarding security

Security reasons prevent usage of digital technologies and social media in B2B marketing (Garrido et al., 2011; Karjaluo et al., 2015; Keinänen & Kuivalainen, 2015; Lee & Park, 2008; Wang, Pauleen, et al., 2016). This in particular leads to low levels of trust (Brennan & Croft, 2012; Kahar, Yamimi, Bunari, & Habil, 2012), which has already been found for IT technologies in general (Ryssel, Ritter, & Gemünden, 2004). Companies are eager to gain information regarding data security of purchased products. However, this information has to be shared for the benefit of all stakeholders, especially between supplier and buyer (Obal & Lancioni, 2013). Regarding our statements concerning different requirements among specific functions or industry sectors, we hereby see a further development that should be addressed in context of market segmentation. Security is furthermore closely aligned to risk perception, which rises with increased buying frequency. So far, little research exists in B2B contexts, according to Jussila et al. (2014), motivating us to integrate this issue within a separate section. This leads us to the following hypothesis:

**H3a.** Buying frequency correlates positively with requirements for information regarding security in DSMM.

**H3b.** The function of a buyer affects requirements for information regarding security in DSMM.

**H3c.** The industry sector affects requirements for information regarding security in DSMM.

**H3d.** The country affects requirements for information regarding security in DSMM.

#### 4.4. Mobile devices

The use of mobile devices for industrial buying is expected to rise in the future (Bolat, 2016; Järvinen et al., 2012; Lee & Park, 2008; Salo, 2012; Strong & Bolat, 2016; Wang, Hsiao, et al., 2016; Wang, Pauleen, et al., 2016). Picoto, Bélanger, and Palma-dos-Reis (2014) find the buying relationship between industrial customers and suppliers regarding information provision on mobile devices as important for

adoption. Park and Chen (2007) find a correlation between characteristics of a buyer and B2B mobile use. Adding to this, Maduku, Mpanganjira, and Duh (2016) show that proximity to management support influences B2B usage of mobile devices positively, which corroborates the findings of Park and Chen (2007). Furthermore, values and norms present in the industry sector influence the usage of mobile devices (Schultz et al., 2012). Consequently, we propose the following hypotheses:

**H4a.** Buying frequency correlates positively with future usage of mobile search.

**H4b.** The function of a buyer affects the usage of mobile search.

**H4c.** The industry sector affects the usage of mobile search.

**H4d.** The country affects the usage of mobile search.

#### 4.5. Social Media

Social media is rapidly gaining importance in B2C marketing (Kaplan & Haenlein, 2010; Mangold & Faulds, 2009). However, in industrial buying, it is still used scarcely (Karjaluo et al., 2015; Michaelidou et al., 2011; Moore et al., 2013; Swani et al., 2014, 2016). Adoption of organizations and accordingly designed strategies are under investigation in extant research (Leek et al., 2016; Siamagka et al., 2015). Our study adds to current literature, as it investigates Social Media mainly from a perspective of enterprises providing information, rather than utilizing information via Social Media (Heller Baird & Parasnis, 2011). Järvinen and Taiminen (2016), Wang, Hsiao, et al. (2016) and Wang, Pauleen, et al. (2016) find that the usage of social media within B2B marketing saves time for buyers, linking it to their buying behavior. We suggest that buying frequency might hereby be an influential factor on using Social media. So far, Social media in industrial buying is mainly considered by personal motivation or experience and for personal use (Agnihotri et al., 2016; Guesalaga, 2016; Lacka & Chong, 2016; Steyn, Salehi-Sangari, Pitt, Parent, & Berthon, 2010). Consequently, it is not widely used by key account managers and employees so far (Lacoste, 2016; Schultz et al., 2012). However, in some cases, social media are already used in complex B2B contexts, such as in product innovation and in co-creation processes (Agnihotri et al., 2016; Jussila et al., 2014; Karjaluo et al., 2015; Keinänen & Kuivalainen, 2015; Singaraju et al., 2016) which relates to delineations between different functions of buyers. Furthermore, adoption of social media in B2B environments differs between different industry sectors (Agnihotri et al., 2016; Veldemann et al., 2015) as well as in the context of buying frequency (Rodriguez et al., 2012). Thus, we developed the following hypothesis:

**H5a.** Buying frequency correlates positively with future usage of social

**Table 2**  
Research methods (n = 37).

Research method	2008–2010	2011	2012	2013	2014	2015	2016	Total
Literature-based/ conceptual			1	1		1	1	4
Content analysis			1		1		4	6
Case study/ interview			1		2	3	7	13
Survey	1	2	3	1	1	3	3	14
Total	1	2	6	2	4	7	15	37

media.

**H5b.** The function of a buyer affects future usage of social media.

**H5c.** The industry sector affects future usage of social media.

**H5d.** The country affects future usage of social media.

## 5. Method

We examine the perception of DSMM for industrial buying within 139 companies, which buy industrial sensor technology from a German supplier. Hereby, sensor technology presents a technological field of high importance for manufacturing industries. Especially in the Internet of Things, sensors present a key enabling technology for interaction, in order to obtain data from both the virtual and real worlds (Bauer et al., 2015).

### 5.1. Data collection

Our sample encompasses the customer database of the sensor supplier examined in Poland and Germany. In mid-2016, we sent questionnaires via email to all its customers and asked the enterprises to select their most suitable respondent to answer the questionnaire (Kumar, Stern, & Anderson, 1993). To customers in Poland, 1963 emails were sent, whereas 1900 customers were contacted in Germany. The recipients were given two weeks for answering the questionnaire. After one week, a reminder was sent. In total, 139 responses were obtained, 100 from Poland and 39 from Germany, resembling a response rate of 5.1% in Poland and 2.1% in Germany. The response time was between seven and 9 min.

Addressing the rather low response rate, we checked for non-response bias (Armstrong & Overton, 1977; Lambert & Harrington, 1990). Therefore, we divided the sample into two groups of equal size, namely the first and last 20% of respondents based on the dates on which responses were received. By comparing all variables obtained in the survey using *t*-tests, we found no statistically significant differences

**Table 3**  
Measurements for influences on information behavior.

Constructs	Scale	Items of scales	Reliability	Variance
Buying frequency (Johnston & Lewin, 1996)	(1) Don't agree (10) Fully agree	(1) We regularly buy products. (2) Buying of products is routine for us.	0.818 0.731	0.081 0.093
Position	(a) Procurement (b) Management (c) Senior management (d) Production (e) R&D		N/A	N/A
Industry Sector	(a) Consumer goods (b) Raw materials (c) Automotive (d) Electrical & ICT (e) Machine building		N/A	N/A

between early and late responses at 95% confidence intervals. Therefore, a considerable influence of non-response bias on the results can be ruled out.

Out of 139 responses, 14 come from procurement, 9 from management, 21 from senior management, 60 from production-related functions and 25 from R&D-departments. Further, 10 respondents did not state their function. Regarding the industry sector, 16 responses are from consumer goods, 8 from raw materials, 28 from the automotive industry, 26 from the electrical and ICT industry and 45 from machine building industries. Sixteen respondents did not state the industry sector of their companies.

### 5.2. Measures and analysis

We apply the construct of buying frequency by Johnston and Lewin (1996). The answer options for function of the buyer and the industry sector were derived from the customer database of the supplier and in accordance with its sales representatives. Due to relatively few cases, nine responses from management and eight responses from raw materials industries were not included in the respective analysis regarding group differences. The same applies for respondents that did not state their function or industry sector of their company, which were also excluded in the respective analysis of group differences. Table 3 shows the items used for the measurement of the independent variables on information behavior.

In developing the questionnaire, we ensured the conceptual equivalence of terms (Singh, 1995) between Poland and Germany. Our team of researchers conducted interviews with representatives of the sales divisions from the examined industrial supplier. The translational equivalence of the questionnaire was ensured by back translations and checks for consistency, performed by sales personnel from Germany and Poland (Kumar et al., 1993; Singh, 1995; Van de Vijver & Leung, 1997). As shown in Table 2, reliability is ensured by a Cronbach's alpha value of 0.818, indicating that these constructs are reliable for usage (Fornell & Larcker, 1981; Schmitt, 1996). Table 3 shows the dependent variables for changing information behavior in the future. A short introductory text explained to respondents that they should answer the following statements regarding expected changes in their information behavior when buying industrial products from the sensor supplier investigated in this study. The timeframe for their evaluation should be five years, in order to obtain an explorative view on changes in information behavior through DSMM. Further, respondents should refer to information required for buying from the sensor supplier. Sources should be considered as a combination of conventional and digital sources, i.e. referring to the total number of sources.

## 6. Results

For frequency of buying, the data were analyzed using the IBM SPSS statistics software with Bravais-Pearson correlation coefficients

**Table 4**  
Measurements for future information behavior.

Constructs	Scale	Items of scales	Mean	SD
Requirement	(1) Strongly decrease (10) Strongly increase	The amount of required information will decrease/Increase.	6.94	2.00
Sources	(1) Strongly decrease (10) Strongly increase	The number of sources used will decrease/Increase.	5.71	2.37
Security	(1) Strongly decrease (10) Strongly increase	The importance of information for data security will decrease/Increase.	7.34	1.92
Mobile devices	(1) Don't agree (10) Fully agree	I will use mobile devices for buying.	6.19	3.33
Social Media	(1) Don't agree (10) Fully agree	I will use social media for buying.	2.99	2.33

**Table 5**  
Results of Bravais-Pearson correlation factors.

	Requirement	Sources	Security	Mobile Search	Social Media
Frequency of buying	0.148**	n.s.	-0.249*	n.s.	n.s.

n.s., not significant

\* Relationships are considered significant at  $p < 0.05$ .

\*\* Relationships are considered significant at  $p < 0.01$ .

**Table 6**  
Significance levels of group differences.

	Requirement	Sources	Security	Mobile Search	Social Media
Function of the buyer (ANOVA)	0.336	0.552	0.252	0.023	0.697
Industry sector (ANOVA)	0.078	0.079	0.681	0.211	0.130
Country ( <i>t</i> -test)	0.002	0.943	0.008	0.000	0.255

between the frequency of buying and items in Table 4. The Bravais-Pearson correlation factors for the frequency of buying are shown in Table 5. Regarding group differences, univariate analysis of variance (ANOVA) was used for function of the buyer and industry sectors, whereas *t*-tests were used for the country of origin. For both, the results are shown in Tables 6 for significance levels and Table 7 for group differences.

Table 7 shows only those mean differences between groups, which reached 90% confidence intervals.

Concluding the findings of the correlation analysis in Table 6 as well as the findings of the ANOVAs in Table 7, Table 8 shows the overall results of the hypotheses tested.

Based on the overview provided in Table 8, we discuss each hypothesis in detail in the following.

**Table 7**  
Group differences.

Combination		Mean difference	Standard error	Significance level	
Industry Sector AND Requirement	Automotive	Machine building	-1.190	0.482	0.015
		Electrical & ICT	-0.909	0.546	0.098
Country AND Requirement	Poland	Germany	-1.231	0.354	0.001
		Consumer goods	1.779	0.760	0.021
Industry Sector AND Sources	Electrical & ICT	Machine building	1.165	0.589	0.050
		Automotive	1.332	0.651	0.043
Country AND Security	Poland	Germany	-1.348	0.347	0.008
		Production	-1.963	0.731	0.008
Function of the buyer AND Mobile Search	R&D	Management	-2.461	0.908	0.008
		Germany	2.881	0.548	0.000
Country and Mobile Search	Poland				

### 6.1. Required information

H1a is supported, as buying frequency correlates positively with requirements for information. Frequent buyers within our sample also expect increased requirement for information in DSMM in comparison to less frequent buyers. The general influence of buying frequency on buying behavior (Johnston & Lewin, 1996) can also be confirmed for DSMM in B2B contexts.

H1b is not confirmed, as no differentiation for buyers' functions is found regarding requirements for information. In this respect, our study opposes current research, which found distinctions between different functions of buyers in context of required information in DSMM (Huotari et al., 2015; Lipiäinen & Karjaluoto, 2015). It has to be noted that the two studies mentioned beforehand derive their information from qualitative data within a single case study (Lipiäinen & Karjaluoto, 2015) and a multiple case study with four participants (Huotari et al., 2015) in contrast to our quantitative study.

H1c is supported, as the automotive industry expects lower increases in required information than the machine-building as well as electrical and ICT industries. We explain this result as indicating that the automotive industry and its supply chain could already be more interconnected and standardized in terms of information search and purchase than the machine-building as well as electrical and ICT industries. As a result, the information requirements as well as standards for information provision could already be at an augmented level that the machine-building industry is just about to approach. This result is in line with current research concerning the German manufacturing industries (Bauer et al., 2015).

H1d is also supported, as German respondents expect a higher increase in information requirements than Polish respondents. This can be explained for developments regarding the Industrial Internet of Things, coined as "Industrie 4.0" in Germany, the German industry takes a leading role worldwide and especially in Europe. Therefore, companies' awareness regarding increasing information requirements could be a higher level in Germany than in Poland (Bauer et al., 2015; Müller et al., 2018).



**Table 8**  
Results of hypotheses tested.

	Requirement (H1)	Sources (H2)	Security (H3)	Mobile search (H4)	Social media (H5)
a) Buying frequency	Supported	–	Opposite direction	–	–
b) Function of the buyer	–	–	–	Supported	–
c) Industry Sector	Supported	Supported	–	–	–
d) Country	Supported	–	Supported	Supported	–

–, Not supported.

## 6.2. Number of sources

H2a is not supported. We cannot find significant correlations with frequency of buying or function of a buyer for the number of sources in DSMM within our sample. H2b is also not supported, as none of the functions of buyers shows specific differences regarding the number of sources in DSMM. This could be explained as new sources such as social media are still considered to be relevant at a low level, as discussed in [Section 6.5](#).

H2c is supported, as electrical and ICT companies expect a higher increase in information sources in DSMM than all other industry sectors regarded. This finding could be explained by applying the results of [Veldemann et al. \(2015\)](#), who find differences between IT and other industry sectors. Electrical and ICT industry today is closely connected to IT technologies, possibly explaining its affinity to new, IT-based information sources.

H2d is not supported, the results do not show differences regarding changes in the number of sources used between Poland and Germany. Regarding the findings of H4d, an increasing importance of mobile devices in Poland, future studies should evaluate whether mobile devices replace traditional information sources or whether respondents cannot fully grasp those developments yet.

## 6.3. Information regarding security

The results are opposite the prediction made in H3a. The present results show that buying frequency negatively correlates with increasing requirements for information concerning security. In contrast to our first assessment, increased buying frequency might lead to increased levels of trust between buyer and supplier. A closer and more frequent cooperation between supplier and buyer could mean that information concerning security is regarded to be less important ([Wilson et al., 2001](#)). However, a differentiation between data security as a threat from third parties and data security as the level of trust between supplier and customer should be incorporated in further research.

H3b is not supported, therefore not confirming the findings of [Karjaluoto et al. \(2015\)](#) in terms of differences between functions and divisions. The same applies for H3c, which is also not supported. As noted for H3a, a differentiation between data security as a threat from third parties and data security as the level of trust between supplier and customer should be addressed in further investigations.

H3d is supported, as German respondents expect a higher importance of information regarding security in comparison to Polish enterprises. Subsumed as developments that are known as 'Industrie 4.0' in Germany, as outlined in [Section 6.1](#), high concerns towards data security as well as data ownership have been found for German enterprises ([Kiel, Müller, & Voigt, 2017](#)). In Poland, such concerns could not have risen to a similar extent, as developments regarding the Industrial Internet of Things are still at a lower level.

## 6.4. Mobile devices

H4a is not supported, as the frequency of buying does not correlate significantly with the usage of mobile search. Further research should address the reasons for the usage of mobile search more in-depth to

examine this result, possibly using mobile technologies less often if buying is more frequent, as when it becomes a standardized process. Factors related to personality or habit of using mobile devices could also be incorporated in this research.

H4b is supported, as participants from production-related functions as well as from management show a higher tendency to use mobile devices for information search. We interpret these findings, as buyers in production might mean that the person has a different working environment than in other functions. Production could be the primary task within this function, where personnel does not have access to computers. Therefore, mobile devices might be more useful, being able to operate these whilst fulfilling tasks in production. The same applies for management functions, who, among all other functions within our sample, might be the ones traveling most and therefore also considering mobile devices for industrial buying activities.

H4c is not supported, as no group differences can be found for using mobile devices in the future, despite the findings of [Heller Baird and Parasnis \(2011\)](#) and [Moore et al. \(2013\)](#), stating a high importance of social media in the consumer goods industry.

H4d is supported, Polish respondents expect a higher increase in usage of mobile devices for industrial buying than German respondents. This could be explained by the fact that currently, the use of mobile devices in Poland is not so common, or a higher affinity to mobile devices is present in Poland. In fact, the European Statistics Authority ([Eurostat, 2016](#)) shows a lower penetration of mobile devices for Polish companies in comparison to German companies.

## 6.5. Social Media

H5a is not supported, as frequency of buying does not correlate significantly with usage of social media. As noted by [Karjaluoto et al. \(2015\)](#) and [Michaelidou et al. \(2011\)](#), social media still faces a low importance within B2B contexts, as expressed by a mean value of 2.99 for social media within our sample.

H5b is not corroborated, as no group differences for the function of the buyer and social media usage can be found within our sample. We interpret these findings, as in contrast to the current body of literature, our sample encompasses industrial buying activities, whereas several studies investigate social media in B2B contexts in general. This is in line with [Guesalaga \(2016\)](#), stating that social media is currently used mainly in personal contexts, also relating to B2B environments. We suggest that this differentiation of purposes of social media in B2B contexts should be addressed in further research. Also, the reasons for this perception of future low importance regarding social from a user perspective, rather than providing information ([Heller Baird & Parasnis, 2011](#)) should be addressed.

H5c is not supported, as no group differences can be found for using social media in industrial buying which other researchers had uncovered, such as [Heller Baird and Parasnis \(2011\)](#) or [Moore et al. \(2013\)](#).

H5d is not supported, as the expectations regarding future usage of social media in industrial buying do not differ significantly between Poland and Germany, which is in line with the findings for Social Media in industrial buying within our sample in general.

## 7. Conclusion

Our paper investigates changing information behavior in industrial buying in context of DSMM. Within a sample of 139 industrial enterprises in Poland and Germany that are buyers for a single German industrial supplier, representatives evaluated five statements regarding changing information behavior related to DSMM which were derived from our systematic literature review. Furthermore, the opinion of sales division representatives from the industrial sensor supplier examined was integrated whilst deriving those changes in buying behavior. We investigate potentially influential factors on these changes in buying behavior: Frequency of buying, the function of the buyer, and the industry sector. From 20 sub-hypothesis in total, seven are confirmed, twelve are not supported and once, the results are opposite the prediction.

The frequency of buying shows a positive correlation with requirement for information and a negative correlation with future requirement for information concerning data security. We also find that production and management functions within an enterprise have a larger tendency towards using mobile devices in industrial buying. Regarding the industry sector, the automotive industry expects a lower impact on requirements for information through DSMM than machine building as well as electrical and ICT industries. Further, the electrical industry expects a higher increase in sources used for industrial buying than machine building as well as electrical and ICT industries. Finally, whereas German respondents expect higher information requirements as well as information requested regarding security, Polish respondents expect a higher increase in usage of mobile devices in industrial buying.

### 7.1. Theoretical implications

This study contributes to the current state of research on industrial buying and DSMM in several ways. First, we conduct a systematic literature review in the field of DSMM and industrial buying, finding 37 research articles that investigate this topic so far. From these 37 articles, we condense six research streams that investigate DSMM in industrial buying. The first research stream consists of eleven articles that investigate factors leading to or preventing Social Media usage in industrial buying. A second research stream evaluates outcomes of DSMM in B2B usage. The third research stream combines the first two, investigating factors that lead to or prevent Social Media usage as well as its outcomes in industrial buying. A fourth research stream consists of articles that perform a content analysis of Social Media content in industrial buying. Finally, a fifth research stream presents best practice examples of DSMM usage in B2B contexts.

Second, we capture the expectations of DSMM uttered by nine sales representatives of a German sensor supplier via interviews. These express their expectations of DSMM, resembling in five changes in information behavior of customers: Increased requirement for information for industrial buying, increased number of sources for industrial buying, increased requirement for information regarding security, increased usage of mobile devices in industrial buying as well as increased usage of Social Media. We confirm and condense expectations of nine sales representatives interviewed with literature, finding that these developments resemble changes in buying behavior discussed in current research. In sum, this paper presents a set of changes in information behavior through DSMM that both address the requirements for changing information behavior (Alejandro et al., 2011). This is required as past studies were conducted before DSMM developments had been implemented (Brossard, 1998; Moriarty & Spekman, 1984). Further, we are able to present findings regarding changing information behavior within a sample that all purchase from a common supplier, who closely conducted the study in accordance with the team of researchers, which resembles a recommendation for marketing research in B2B contexts by Brennan et al. (2014).

Third, we capture the expectations of the nine sales representatives

for factors applicable for customer segmentation in DSMM and develop them against the background of existing literature together with sales representatives of the sensor supplier regarded. We point directions for criteria for customer segmentation in DSMM, answering to the call of Lamberton and Stephen (2016). This empirical approach is one the first that investigates customers' expectations on DSMM in context of a common supplier, rather than regarding the provider of DSMM or the user perspective.

Fourth, our study finds evidence that buying frequency, distinct industry sectors, functions of buyers, as well as the country of a buyer have an influence on developments related to DSMM. Although our study is of exploratory nature and therefore has several limitations, we are able to lay the foundation for further studies in this field, as described in Section 7.3. Extending current literature, we find that frequency of buying can lead to increased levels of trust in DSMM, therefore reducing requirements of information concerning security. Further, we find hints that industry-specific characteristics towards DSMM, e.g., its role and potential for the respective industry sector, influence the way it is appreciated and used. The same applies for the function of the buyer, for which his or her working environment might play a role towards the expectations towards DSMM. Still, these findings only provide first evidence that must be further elaborated, as described in Section 7.3.

Fifth, as stated by Alejandro et al. (2011), empirical evidence on information and buying behavior in non-English-speaking countries is rare and therefore allows for the cross-validation of constructs in different contexts (Guenzi, Georges, & Pardo, 2009). Germany, an established industrial nation, and Poland, an emerging industrial nation with huge potential, hereby present a valid and valuable set of countries for comparison and show interesting insights and differences concerning the expected changes in future buying behavior.

### 7.2. Managerial implications

Based on the empirical findings of this study, several implications can be derived. Addressing the customer segmentation factor of buying frequency, we recommend an increased information provision for frequent buyers in the context of future buying behavior. For information concerning data security, the capabilities of the own products concerning data security should be integrated into the B2B marketing strategy to emphasize those for buyers.

Concerning the function of a buyer, the results suggest that production-related as well as management functions have the highest tendency to encounter changes in their buying behavior through DSMM. However, this finding should be validated in future studies. So far, it can be concluded that distinct and individual information provision for these two functions within an enterprise could present benefits in B2B marketing of suppliers. For both functions, the provision of data and information for mobile devices can be emphasized in the future. Visualization of information on mobile devices for production environments could encourage production-related to value the supplier's efforts, whereas management functions could value information provision during traveling or meetings. Also, the existence of these mobile means should be addressed in B2B marketing for production as well as management functions.

Still, the demands and expectations of further functions should be addressed in future studies. At the current stage, suppliers should consider if these functions are not informed well enough concerning changing information behavior in DSMM in their current marketing strategy.

From the perspective of different industry branches, especially machine building as well as electrical and ICT industry should be provided with adequate marketing content for increased information requirements. The same goes for providing additional sources of information, that are especially demanded from electrical and ICT enterprises. For further industries, suppliers should, in line with strategies

concerning the function of the buyer, consider if their information provision is established well-enough or if those industries do not face alterations to buying behavior through DSMM to an extent that other industries will. The possibilities social media should be evaluated, if unsuitable for these industries or if capabilities are unknown and should therefore be promoted in future B2B marketing strategies.

Regarding differences between Poland and Germany, we suggest providing increased amounts of information to German buyers, especially regarding data security. In this respect, the beforehand mentioned delineation between data privacy regarding third parties and data security regarding, e.g. hacker attack, is of prime importance. For Polish buyers, information provision on mobile devices presents a valuable opportunity that should be harnessed.

From the literature review conducted in this study, we conclude that content and factors leading to DSMM usage are influencing variables that have a significant influence on its success, as discussed in several studies and illustrated in the collection of research streams. Consequently, practitioners should not only consider whom to address with DSMM and with how many information and sources, as conducted in the empirical approach of this paper. Moreover, it should be considered how DSMM content should be designed in detail and how factors leading to its usage can be fostered, as well as how factors preventing its usage can be addressed. Therefore, future investigations should consider customer segmentation not only from the perspective of changes in information behavior through DSMM at a general level. It should be regarded which types of customers tend to value which kind of DSMM content and how it should be placed for specific customer groups. As this suggestion also applies for further research, it will be further elaborated in the next section.

### 7.3. Limitations and future research

Our results are subject to several limitations that must be considered. The perception of changing information behavior in industrial buying can create patterns of understanding for both academic and managerial considerations. However, our five main hypotheses were chosen on the basis of market segmentation and from the practical perspective of the German sensor supplier regarded, not detailed investigations regarding DSMM elements. Aiming to present an investigation relevant for practice, this limits our findings from the

perspective of research. More profound investigations regarding the specific subcategories of changing information behavior in industrial buying and industrial marketing are therefore necessary as a next step. This especially accounts for factors that were not regarded in this study, namely the influence of personal attributes such as age or private information behavior and the importance of industrial brands.

Furthermore, due to the rather low response size, the sample size is rather low regarding the intention to derive group-specific differences in terms of function of the buyer and industry sector. Consequently, our study has a rather exploratory character, requiring future studies to validate and extend our findings with a larger sample size.

Additionally, we encourage the investigation of several functions within the same enterprise. Thereby, cross-correlations between the function of buyers and industry sectors could be established. Furthermore, the investigation of buying behavior regarding other products than industrial components, such as services, could provide valuable insights. An in-depth analysis of reasons for stating different importance levels of future trends in industrial information and purchasing is a further suggestion for future research. Finally, an international comparison of information search and behavior, such as linking to countries or industries where DSMM in industrial buying is at a different stage of development, could present a valuable contribution.

As a general recommendation for future DSMM research in industrial buying, we recommend the integrative investigation across several research streams identified in the literature review. As discussed in managerial implications, many empirical approaches, including the one conducted in this paper, either consider rather general, or rather specific subtopics of the phenomenon. For future research, an interconnection of the research streams identified would present a valuable contribution. This includes, for example, the interconnection of DSMM content analysis, the measurement of its outcomes as well as factors leading to and preventing its usage by customers. Together with the contributions of the empirical approach of this paper regarding the topic of customer segmentation, future studies could investigate the topic of whom to address with which kind of content, how DSMM should be placed in the own marketing strategy among other sources, and what outcomes can be generated by using DSMM for which group of customers. This investigation could present valuable findings for research and furthermore foster strategy definition of DSMM for many companies.

## Appendix A

Table A.1  
Results of article categorization ( $n = 37$ ).

Year	Author(s)	Method	Category
2008	Lee, T. M., & Park, C.	Survey	A) Evaluating impacts of DSMM usage
2011	Garrido, M. J., Gutiérrez, A., & José, R. S.	Survey	D) Qualitative examples from corporate practice regarding DSMM
2011	Michaelidou, N., Siamagka, N. T., & Christodoulides, G.	Survey	A) Factors influencing DSMM usage
2012	Brennan, R., & Croft, R.	Content analysis	D) Content analysis of Social Media
2012	Järvinen, J., Tollinen, A., Karjaluoto, H., & Jayawardhena, C.	Survey	A) Factors influencing DSMM usage
2012	Rodriguez, M., Peterson, R.M., & Krishnan, V.	Survey	A) Evaluating impacts of DSMM usage
2012	Salo, J.	Case study/ Interviews	C) Combination of A) and C)
2012	Schultz, R., Schwepker, C., & Good, D.	Survey	
2012	Sood, S.C. & Pattinson, H.M.	Literature-based	A) Evaluating impacts of DSMM usage
2013	Moore, J. N., Hopkins, C. D., & Raymond, M.A.	Survey	C) Combination of A) and C)
2013	Wiersema, F.	Literature-based	D) Qualitative examples from corporate practice regarding DSMM
2014	Holliman, G., & Rowley, J.	Case study/ Interviews	D) Qualitative examples from corporate practice regarding DSMM
2014	Jussila, J. J., Kärkkäinen, H., & Aramo-Immonen, H.	Survey	C) Combination of A) and C)

2014	Katona, Z. & Sarvary, M.	Case study/ Interviews	D) Qualitative examples from corporate practice regarding DSMM
2014	Swani, K., Prown, B. P., Milne, G.R.	Content analysis	D) Content analysis of Social Media
2015	Habibi, F., Hamilton, C. A., Valos, M. J., & Callaghan, M.	Literature-based	A) Factors influencing DSMM usage
2015	Huotari, L., Ulkuniemi, P., Saraniemi, S., & Mäläskä, M.	Case study/ Interviews	D) Qualitative examples from corporate practice regarding DSMM
2015	Karjaluoto, H., Mustonen, N., & Ulkuniemi, P.	Case study/ Interviews	A) Evaluating impacts of DSMM usage
2015	Keinänen, H., & Kuivalainen, O.	Survey	A) Evaluating impacts of DSMM usage
2015	Lipiäinen, H. S. M., & Karjaluoto, H.	Case study/ Interviews	D) Qualitative examples from corporate practice regarding DSMM
2015	Siamagka, N., Christodoulides, G., Michaelidou, N., Valvi, A.	Survey and interviews	A) Evaluating impacts of DSMM usage
2015	Veldemann, C., Van Praet, E., & Mechant, P.	Survey	A) Evaluating impacts of DSMM usage
2016	Agnihotri, R., Dingus, R., Hu, M., Krush M. T.	Survey	A) Evaluating impacts of DSMM usage
2016	Bernard, M.	Case study/ Interviews	D) Qualitative examples from corporate practice regarding DSMM
2016	Bolat, E.	Case study/ Interviews	A) Evaluating impacts of DSMM usage
2016	Guesalaga, R.	Survey	A) Factors influencing DSMM usage
2016	Järvinen, J., & Taiminen, H.	Case study/ Interviews	D) Qualitative examples from corporate practice regarding DSMM
2016	Lacka, E., Chong, A.	Survey	A) Factors influencing DSMM usage
2016	Lacoste, S.	Case study/ Interviews	A) Factors influencing DSMM usage
2016	Leek, S., Canning, L., & Houghton, D.	Content analysis	D) Content analysis of Social Media
2016	Mehmet, M. I. & Clarke, R. J.	Case study/ Interviews	D) Content analysis of Social Media
2016	Rooderkerk, R., & Paulwels, K. H.	Content analysis	D) Content analysis of Social Media
2016	Singaraju, S. P., Quan, A. N., Niininen, O., Sullivan-Mort, G.	Literature-based	A) Evaluating impacts of DSMM usage
2016	Strong, J., & Bolat, E	Case study/ Interviews	D) Qualitative examples from corporate practice regarding DSMM
2016	Swani, K., Milne, G.R., Prown, B. P., Assaf, A. G. & Donthu, N.	Content analysis	D) Content analysis of Social Media
2016	Wang, W. Y. C., Pauleen, D. J., & Zhang, T.	Case study/ Interviews	B) Evaluating impacts of DSMM usage
2016	Wang, Y., Hsiao, S., Yang, Z. & Hajli, N.	Survey	A) Factors influencing DSMM usage

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