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Selecting Technologies for Social Commerce: Towards a Systematic Method

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SELECTING TECHNOLOGIES FOR SOCIAL COMMERCE: TOWARDS A SYSTEMATIC METHOD

Complete Research

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Abstract

Social commerce, the use of social media in e-commerce, has become increasingly popular in research and practice. As social commerce initiatives are enabled by technologies, their success considerably depends on the ability of companies to select adequate candidates from the available social commerce technologies. However, with the popularity of social commerce, the number of technologies is steadily increasing. Without guidance, the selection of technologies becomes cumbersome and risky. Moreover, while social commerce initiatives are most effective if they combine multiple different technologies, existing software selection approaches are limited to a specific technology and only support selecting one product from a set of technologically equivalent alternatives. Combining design science research with action research, we therefore propose a new method to support the selection of multiple complementary social commerce technologies. The contribution is twofold: (1) we propose a procedure model that describes the problem of selecting a set of multiple technologies as tailor-made decision-making process; (2) we introduce a technology assessment catalog as a consolidated information base to assess social commerce technologies with respect to their impact on customers' buying behavior. The results of an evaluation in a social commerce project indicate that the method supports the selection of social commerce technologies.

Keywords: Social Commerce, Social Media, E-Commerce, Decision Making, Design Science

1 Introduction

In recent years, social media have become an important means to transform the formerly transactional and product-oriented e-commerce into a more lucrative, relationship-based and customer-centric business (Constantinides et al., 2009, Wigand et al., 2008). By integrating social technologies into e-commerce platforms, customers can be stimulated to actively participate in the various stages of the buying process and hence become a key part of the value chain (Ickler et al., 2009, Rad and Benyoucef, 2010). In literature, such initiatives are summarized under the term *social commerce*, which is considered as a new form of e-commerce that places special emphasis on the active participation, communication, and interaction of customers through the use of social media (Turban et al., 2010, Wang and Zhang, 2012,

Zhou et al., 2013). Social commerce initiatives are rapidly becoming popular in practice as the provisioning of social media, which are adopted and used by customers, can positively influence customers' buying behavior (Dhar and Chang, 2009, Mikalef et al., 2013, Olbrich and Holsing, 2012).

However, together with the popularity of social commerce, the number of available social commerce technologies has been steadily increasing over the past decade (Curty and Zhang, 2013). Meanwhile, there exists a wide range of technologies, such as rating and review systems, social recommendation systems, or community systems, which offer diverse functionalities and support different use cases (Mulpuru et al., 2010). Hence, the success of social commerce initiatives considerably depends on the ability of companies to efficiently identify and select technologies that best fit their business strategy (Huang et al., 2012). Furthermore, research indicates that social commerce initiatives can be more effective if they combine multiple complementary technologies (Huang and Benyoucef, 2013a). However, the selection of adequate technologies is a cumbersome and risky task. It is cumbersome because a wide range of functionally different social commerce technologies has to be evaluated although companies typically lack detailed knowledge of such technologies (Huang et al., 2012, Zhou et al., 2013). In addition, the task is risky because selecting the wrong technologies can easily lead to an ineffective social commerce initiative, which fails to encourage customers to buy products from the company's website (Kietzmann et al., 2011, Turban et al., 2010).

It consequently ought to be investigated how different social commerce technologies can be assessed and selected (Hajli, 2013, Turban et al., 2010, Wang and Zhang, 2012). However, research in social commerce is still focused on examining the theoretical foundations, for example the concept itself and its historical evolution (Liang and Turban, 2011, Wang and Zhang, 2012, Zhou et al., 2013), its activities (Saundage and Lee, 2011), technological features (Curty and Zhang, 2013, Huang et al., 2012), and influence factors (Hajli, 2012a, Kwahk and Ge, 2012, Liang et al., 2011). Furthermore, traditional software selection approaches from the related enterprise software domain do neither contain social commerce-specific selection criteria nor support the selection of multiple complementary technologies. Instead, they are limited to a specific technology (e.g., CRM systems) and only support the selection of one software product from a set of technologically equivalent candidates (e.g., Salesforce CRM vs. SAP CRM, see section 2). The task to select multiple complementary technologies that best fit to the goals behind a company's social commerce initiative is thus not supported by these approaches.

To contribute to the closure of this research gap and better support the design of social commerce initiatives, we propose a new method that supports the systematic selection of multiple complementary social commerce technologies. Building upon a research approach that iterates between design science research and action research stages, we address the following research questions: (i) *What are potential criteria to evaluate and select social commerce technologies?* (ii) *How can a company systematically select a set of multiple complementary social commerce technologies?* The action research stages of our research project were conducted at a world-wide leading German enterprise software company, which used the proposed method in a complex social commerce initiative. This setting allowed us to obtain feedback on the practical applicability of the method and to incorporate any necessary adaptations.

The remaining manuscript is structured according to Gregor's and Hevner's guidelines for publishing the results of design science research endeavors (Gregor and Hevner, 2013): in section 2, we describe the theoretical background and further highlight the research gap. In section 3, we explain our research approach. In section 4, we present the developed method to systematically select social commerce technologies. The results of the conducted evaluation are described in section 5. In section 6, we discuss the findings, implications, limitations, and future directions of our research.

2 Theoretical Background

In the following, we describe the theoretical background that our method is built upon. First, we look at the technological perspective of social commerce, identify the underlying technologies, and investigate

their potential impacts. Afterwards, we discuss the characteristics of related software selection approaches from the conceptually close enterprise software domain. Drawing on the existing literature, we then describe the research gap.

2.1 Technological Perspective of Social Commerce

Together with people, information, and the proper business, technologies are perceived as one of the central building blocks of social commerce initiatives (Wang and Zhang, 2012, Zhou et al., 2013). Furthermore, it is emphasized that social commerce is enabled and usually even driven by technologies (Curty and Zhang, 2013). Accordingly, there already exists an entire research stream that investigates which technologies can be used for social commerce initiatives. Despite these efforts, there seems to be no common understanding regarding the technologies that are associated with social commerce. On the one hand, different terms are used to describe technologies. For instance, technologies are described under the terms “feature” (Curty and Zhang, 2013, Huang et al., 2012, Olbrich and Holsing, 2012), “component” (Hajli, 2012b, Leitner and Grechenig, 2009), “functionality” (Ickler et al., 2009), “tool” (Kwahk and Ge, 2012, Leitner and Grechenig, 2008), or “dimension” (Shadkam and O’Hara, 2013). On the other hand, different technology sets, frameworks, and classifications have been proposed (Curty and Zhang, 2011, Curty and Zhang, 2013, Grange and Benbasat, 2010, Huang et al., 2012). To synthesize the different conceptions, we define a social commerce technology to represent a class of functionally similar software products that support social commerce. In its simplest form, a social commerce technology represents a class of software tools with a certain basic functionality (e.g., like buttons, share buttons, etc.). A complex social commerce technology instead represents a class of software systems that provide a certain multifaceted functionality (e.g., co-browsing systems, community systems, etc.). Table 1 gives an overview of social commerce technologies that have frequently been mentioned in research-oriented and practitioner-oriented literature.

<i>Technologies</i>	<i>References</i>
<ul style="list-style-type: none"> • Activity/news feeds^[2,5,9] • Ask a friend/expert tools^[2,4,5,9] • Co-browsing/co-shopping systems^[4,5,8,9,10] • Collaboration systems (e.g., blogs, micro-blogs, wikis)^[1,2,4,6,7,9,10] • Communication systems (e.g., text, audio, video chat)^[1,2,5,6,9] • Community systems (e.g., discussion boards, forums)^[1,2,4,5,6,10] • Group buying systems^[2,4,5,8,9] • Like, share, and follow buttons^[2,4,5,6,8,9,10] • Rating and review systems^[1,2,3,4,5,6,7,8,9,10] • Social bookmarking systems (e.g., favorites, tags, wish lists)^[1,2,3,4,5,6,7,9] • Social login tools (login and connect with social network profile)^[8,9] • (Social) recommendation systems^[2,4,5,6,9,10] 	<p><i>Research-oriented literature:</i></p> <p>[1] Curty and Zhang (2011) [2] Curty and Zhang (2013) [3] Grange and Benbasat (2010) [4] Huang et al. (2012) [5] Huang and Benyoucef (2013b) [6] Kailer et al. (2013) [7] Leitner and Grechenig (2008)</p> <p><i>Practitioner-oriented literature:</i></p> <p>[8] Khera (2012) [9] Marsden (2010) [10] Mulpuru et al. (2010)</p>

Table 1. Frequently mentioned social commerce technologies

As several terms, technology sets, and classifications are used in parallel today, the selection of social commerce technologies is generally made difficult. Additionally, only little research has examined the design of social commerce platforms. To support this task, Huang and Benyoucef (2013a) developed a basic reference model of a social commerce platform that contains four layers of abstract social commerce features. The innermost “individual” layer is composed of features that represent the users on a social commerce platform and allow them to generate individual content. The surrounding “conversation” layer comprises features that allow customers to interact and share content with others. The “community” layer summarizes features to coordinate and endorse conversations to build a community. The outermost “commerce” layer comprises features that leverage communities to facilitate commercial activities, for example, by generating recommendations based on the user interactions. After applying the model to two leading social commerce platforms, Huang and Benyoucef (2013a) demonstrate that social

commerce platforms can be more effective if they cover all four layers with a minimum set of social commerce features. Though, they only sporadically describe how technologies can be used to fill the layers. Moreover, their model does not provide information about the resulting business impact, leaving open the question which of the proposed features a company should focus on.

2.2 Potential Impacts of Social Commerce Technologies

According to Turban et al. (2010), a large number of customer- and vendor-related benefits has been associated with social commerce. However, most of these benefits are described in practitioner-oriented publications (e.g., Dennison et al., 2009, Marsden, 2010, Mulpuru et al., 2010) and only few descriptions are grounded on theories or solid empirical data. Since social commerce is centered on customers (Wang and Zhang, 2012), theoretical advice about the impacts of social commerce technologies can best be derived from studies which examine the customers' buying behavior. In this context, Ickler et al. (2009), Kim and Srivastava (2007), and Rad and Benyoucef (2010) conceptually demonstrate how specific social commerce technologies can influence the different stages of the customers' buying process. In addition, several empirical studies have investigated which factors influence customers' buying behavior on social commerce platforms. Table 2 lists factors that have frequently been examined in the literature.

<i>Factor</i>	<i>Description</i>	<i>Social commerce references</i>
Perceived ease of use	Degree to which a person believes that using a particular system would be free of effort (Davis, 1989).	Hajli (2012a); Li et al. (2014); Shen (2012); Teh and Ahmed (2012)
Perceived enjoyment	Extent to which the activity of using the system is perceived to be enjoyable (Davis et al., 1992).	Sharma and Crossler (2014); Shen (2012); Shin (2013)
Perceived usefulness	Degree to which a person believes that using a particular system enhances his or her performance (Davis, 1989).	Li et al. (2014); Hajli (2012a); Shen (2012); Shin (2013); Teh and Ahmed (2012)
Social influence	Degree to which an individual's behavior is affected by others. Differentiated between normative (subjective norm) and informational social influence (Deutsch and Gerard, 1955).	Kwahk and Ge (2012); Lin et al. (2013); Sharma and Crossler (2014); Shin (2013)
Social presence	Degree to which a medium permits users to experience others as psychologically present (Fulk et al., 1987).	Hajli (2012a); Lu and Fan (2014); Shen (2012)
Social support	An individual's perceptions of support from people in their social network, which enhances functioning, or may protect them from adverse outcomes (Demaray and Malecki, 2002).	Li et al. (2014); Liang et al. (2011); Shin (2013); Wang and Hajli (2014)
Trust	Willingness to be vulnerable to another party based on a separate set of trustworthiness beliefs in ability, benevolence, and integrity (Mayer et al., 1995). See Gefen et al. (2003) for additional conceptualizations of trust.	Chow and Shi (2014); Hajli (2012a); Hajli et al. (2014); Kim and Noh (2012); Lu and Fan (2014); Shin (2013); Teh and Ahmed (2012)

Table 2. *Potential impacts of social commerce technologies*

According to the social commerce literature, all of the above-mentioned factors have the potential to positively influence customers' buying behavior. However, most studies focus their investigations on only a small number of factors and rarely specify concrete technologies.

2.3 Characteristics of Software Selection Approaches

Since social commerce technologies represent classes of functionally similar software products, it seems obvious to support the selection task by using existing software selection approaches. Especially in the conceptually close enterprise software domain, various selection approaches have been developed. Referring to the literature reviews conducted by Jadhav and Sonar (2009), Lin et al. (2007), and Sen et al. (2009), approaches for selecting enterprise software share several typical characteristics:

- Nearly all approaches are tailored to support the selection of software products of a specific technology such as customer relationship management (CRM) systems (Colombo and Francalanci, 2004) or enterprise resource planning (ERP) systems (Onut and Efendigil, 2010). Only a small number of approaches is generic and not tailored to a specific technology (Lin et al., 2007, Sen et al., 2009).
- All identified approaches focus on selecting a specific software product out of a set of technologically equivalent software candidates, for example, selecting the most appropriate CRM system out of a set of CRM system candidates (Jadhav and Sonar, 2009, Lin et al., 2007). None of the approaches supports the selection of multiple products that are technologically different.
- Most of the suggested selection criteria are related to quality and cost aspects, such as functional completeness, usability, maintainability or portability. Such criteria are typically relevant when comparing functionally similar software packages. Criteria related to the functionality or the impact of the software packages have rarely been suggested (Jadhav and Sonar, 2009).
- Nearly all proposed selection approaches follow a process of sequential stages, usually starting with the determination of selection criteria, followed by the identification and evaluation of software candidates, and ending with the final purchase decision (Jadhav and Sonar, 2009, Sen et al., 2009).
- As selecting enterprise software generally constitutes a multi-criteria decision-making problem, much effort has been devoted to the development and enhancement of evaluation techniques. Techniques that have been commonly used to select enterprise software are the weighted sum model (WSM), the analytic hierarchic process (AHP), and approaches based on fuzzy set theory (Jadhav and Sonar, 2009, Lin et al., 2007, Sen et al., 2009).
- Most approaches either specify selection criteria, a selection methodology, or an evaluation technique. Only few approaches provide selection criteria together with a selection methodology and an evaluation technique (Jadhav and Sonar, 2009, Sen et al., 2009). Moreover, only half of the approaches has been evaluated through practical application (Jadhav and Sonar, 2009).

Against this background, we found three shortcomings to limit the support of current approaches for the selection of social commerce technologies. First, existing approaches only support the selection of one single software product out of a set of technologically similar software candidates. However, as social commerce initiatives typically combine multiple complementary technologies (Huang and Benyoucef, 2013a), the applicability of traditional software selection approaches is limited. Moreover, product-specific criteria such as quality and costs are not yet relevant when deciding which technologies to use. Such decisions are rather based on factors influencing customers' buying behavior. The available criteria are hence not adequate for the selection of social commerce technologies. Second, due to the different terms, technology sets, and classifications used in the literature, it is not clear for the designers of social commerce initiatives, what technologies are available. Third, most of the impacts associated with social commerce technologies have not been clearly specified yet. While several studies examined the influence factors of various social commerce technologies on the customers' buying behavior, the findings are scattered across the literature base and often not transparent. To provide a better support for the selection of social commerce technologies, we therefore propose a new method that overcomes the before-mentioned deficiencies and provides a tailor-made decision-making procedure.

3 Research Approach

To ensure both the rigorous scientific construction of the proposed method and its practical applicability, we adopted a research approach that combines design science research with action research in an iterative manner (Iivari, 2007, Iivari and Venable, 2009). First, we built upon the design science paradigm to construct the method and its constituents (Hevner et al., 2004). Thereafter, we used the action research paradigm (Baskerville, 1999) to evaluate the developed method in a complex social commerce project of a world-wide leading German enterprise software manufacturer. Thereby, the chosen action research

setting allowed us to delve into the project context and to incorporate any refinements or adaptations into the method that were found necessary to ensure its practical applicability (Iivari, 2007). In contrast to other mixed-method approaches, such as the action design research approach (Sein et al., 2011), our research approach allowed us to begin the construction of the proposed method independently of any project-specific context. Nonetheless, we remained able to promptly adapt to practical requirements due to the subsequent action research step.

For the construction of the method, we closely followed the design science research paradigm, which provides rigorous, scientific guidelines to support the creation of novel IT artefacts (Hevner et al., 2004). Particularly, we implemented two measures: first, we systematically based the construction of our method on the knowledge base (Gregor and Hevner, 2013) and surveyed prior work that could advise the construction of our method. On the one hand, we made use of the existing knowledge about social commerce technologies and their potential impacts. On the other hand, we took into account the typical characteristics of approaches for the selection of enterprise software. Second, we followed the design cycle, a systematic procedure model that structures the design research process into an iterative series of steps with well-defined in- and outputs (Takeda et al., 1990, Vaishnavi and Kuechler, 2004). We only adapted the evaluation step of the model to fit our mixed-method research approach (see Figure 1).

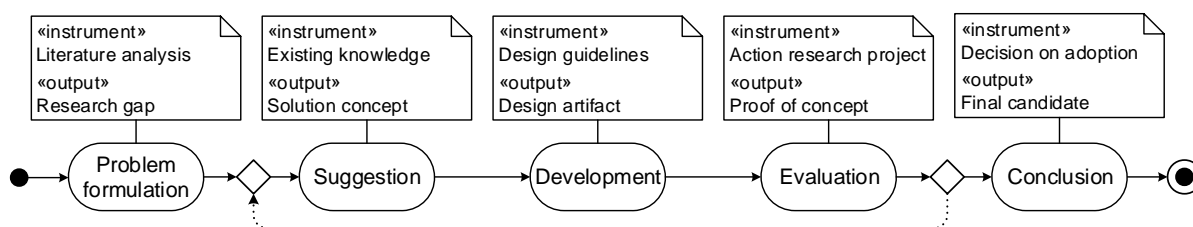


Figure 1. Design cycle of the research project (based on Takeda et al., 1990)

Currently, we have completed the first iteration of the design cycle. In this iteration, we defined the procedure model and the inputs that are required to systematically select social commerce technologies. We began by formulating the research problem. Building upon the knowledge base, we then defined a solution concept. This concept served as a foundation for the development of the actual method in the third step. Finally, we applied the method in a real-world project to evaluate its practical applicability and refine it according to the practical requirements of the project. To this end, we included one of the method's designers as a guide into the project team. He advised the team to proceed according to our method, observed any adjustments that were made in practice, and gathered feedback from the practitioners. Thereby, we also identified room for improvements which we will address in future iterations.

4 Systematic Selection of Social Commerce Technologies

In the following, we present the first version of our method to systematically select social commerce technologies. The goal of our research endeavor was to describe the selection of social commerce technologies as a structured, generally applicable decision-making process. For this purpose, we developed a *procedure model* that operationalizes the selection problem as a set of well-defined steps (see Figure 2). The procedure model is based upon the typical structure of selection methodologies from the enterprise software domain (see section 2). It starts with the determination of relevant selection criteria, followed by the identification of potential technology candidates, and the technology evaluation. Although the procedure model may thus look like other established software selection processes at a first glance, we had to make several modifications to the activities and the parameters of each step in order to support the selection of social commerce technologies. Moreover, we had to introduce an additional step to verify that the selected technologies can be effectively composed with each other (step 4). In general, the procedure model is meant to be executed in sequence but it will also support reiterations if necessary.

Next to the procedure model, consolidated information about available social commerce technologies and their impacts is required to facilitate the selection process. To provide such information, we developed a *technology assessment catalog* that serves as the method's overall input parameter. The catalog has been designed to provide detailed information about the available social commerce technologies and to describe their support of the suggested selection criteria. Building upon the results of our literature review, we initially filled the catalog with a list of available social commerce technologies, a faceted description of their functional characteristics, and a classification of their particular role in an effective social commerce platform. Moreover, the catalog describes various dimensions in which the technologies influence the customers' buying behavior, which are used as selection criteria. During the catalog design, we ensured that both the technologies and selection criteria can be augmented in future.

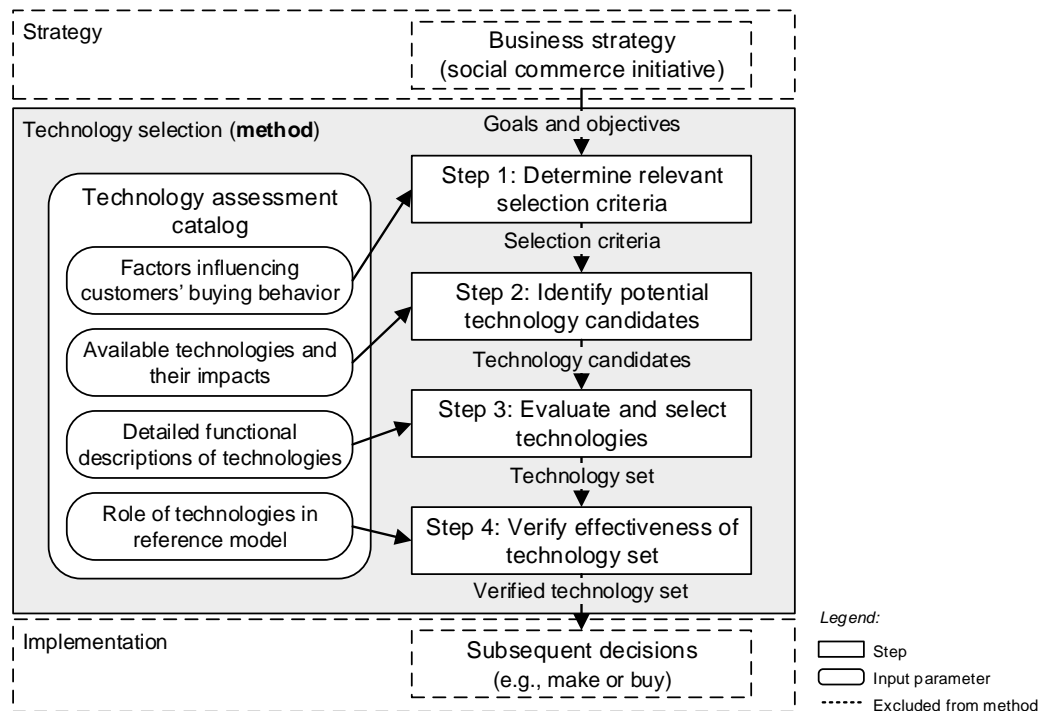


Figure 2. Procedure model of the method

In the next sections, we will describe each step of the method in detail. To illustrate the method's application, we will refer to a fictive company that plans to integrate social commerce technologies into its e-commerce platform to increase the number of transactions and raise the market share.

4.1 Step 1: Determine Relevant Selection Criteria

In step 1, it is necessary to determine appropriate criteria for the selection of social commerce technologies. As discussed in section 2, traditional quality and cost-related criteria from the enterprise software domain do not fit the selection of technologies that offer diverse functions and support different use cases. Instead, a different type of criteria is required that is related to the potential outcome generated by social commerce. Drawing on the results of our literature review, the customers' buying behavior is seen as the dominant outcome variable in social commerce initiatives (Ickler et al., 2009, Kim and Srivastava, 2007, Rad and Benyoucef, 2010, Yadav et al., 2013). Thus, we suggest using the identified factors that influence the customers' buying behavior (see section 2) as selection criteria. In the current version, the technology assessment catalog covers the most frequently cited influence factors, which are *perceived ease of use*, *perceived enjoyment*, *perceived usefulness*, *social influence*, *social presence*, *social support*, and *trust*. Although criteria such as usefulness, social influence, or trust can be further decomposed into more detailed sub-criteria, we suggest to use these criteria in their highest abstraction

level. As practitioners may not be familiar with more detailed sub-criteria such as the different types of trust (Gefen et al., 2003), they might not be able to properly apply them.

Considering the goals and objectives of its business strategy, a company needs to decide which of the proposed selection criteria it intends to target with its social commerce initiative. For example, when a company, on the one hand, plans to increase its reputation, trust may be an important selection criterion. When a company, on the other hand, wants to improve the shopping experience on its website, factors such as perceived ease of use, enjoyment, or usefulness may be considered as relevant criteria. As all of the selection criteria have been operationalized with measurable items in empirical studies, a company can also survey its customers to get advice on which of the proposed selection criteria it should focus. For this purpose, we added several questionnaire items to the technology assessment catalog, which we gathered from literature (see Table 3). By using these questions as guidelines, a company can determine which of the criteria customers perceive to be important and thus try to improve them. This option may be especially useful when a company does not yet have a clearly defined social commerce strategy.

<i>Criteria</i>	<i>Exemplary questionnaire items</i>
Perceived ease of use (adapted from Gefen et al., 2003, Hajli, 2012a, Shen, 2012)	
PEOU1	My interaction with the shopping platform is clear and understandable.
PEOU2	The shopping platform is flexible to interact with.
PEOU3	Learning to operate the shopping platform is easy.
Perceived usefulness (adapted from Gefen et al., 2003, Hajli, 2012a, Kumar and Benbasat, 2006)	
PU1	The shopping platform enables me to search and buy products faster.
PU2	The shopping platform increases my productivity in searching and buying products.
PU3	The shopping platform makes it easier to search and buy products.
Social presence (adapted from Hajli, 2012a, Kumar and Benbasat, 2006, Shen, 2012)	
SP1	There is a sense of human contact in the shopping platform.
SP2	There is a sense of human sensitivity in the shopping platform.
SP3	There is a sense of sociability in the shopping platform.
... (perceived enjoyment, social influence, social support, trust)	

Table 3. Operationalization of selection criteria

Following its before-mentioned goals, our fictive company has to decide which of the specified selection criteria it wants to target with its social commerce initiative. Judging from a conducted customer survey, the company determines that its e-commerce platform ought to better support social presence and social influence. Accordingly, it chooses these two criteria to select adequate social commerce technologies.

Note that our method is designed in a way that additional selection criteria (e.g., company-specific requirements) can be added to the technology assessment catalog. With the continued use of the method, we expect the scope of the catalog to broaden accordingly.

4.2 Step 2: Identify Potential Technology Candidates

The purpose of step 2 is to identify social commerce technologies that are generally able to fulfil the defined selection criteria. As there already exists a large number of functionally diverse social commerce technologies, it is necessary to reduce the number of technology candidates before beginning with a detailed technology evaluation. If the evaluation step would include technologies that do not match the selection criteria, it would otherwise require extensive effort. We support the identification of suitable technology candidates with the technology assessment catalog. Therefore, the catalog contains a list of social commerce technologies that we compiled during our literature review. To complete the list, we furthermore conducted a comprehensive market analysis, in which we examined several social com-

merce software solutions from various software vendors. Currently, the catalog contains 25 social commerce technologies. The catalog also gives information about the ability of the technologies to fulfil the selection criteria that we proposed in step 1. To this end, we categorized the technologies according to the selection criteria as shown in Table 4.

<i>Selection criteria</i>	Perceived ease of use	Perceived enjoyment	Perceived usefulness	Social influence	Social presence	Social support	Trust	<i>References (examples)</i>
<i>Technologies</i>								
Co-browsing/co-shopping systems	-	-	-	-	X	-	-	Seedorf et al. (2014)
Community systems	-	-	-	X	X	X	X	Coulter et al. (2012); Hajli (2012b); Liang et al. (2011)
Group buying systems	-	X*	X*	-	-	-	-	Expert opinion
Like, share, and follow buttons	-	X*	-	X*	-	-	X	Chen et al. (2013); expert opinion
Rating and review systems	-	-	X	X	X	-	X	Hajli (2012b); Kumar and Benbasat (2006)
Social login tools	X	-	-	-	-	-	-	Gafni and Nissim (2014)
(Social) recommendation systems	-	-	X	X	X	-	-	Kim and Srivastava (2007); Kumar and Benbasat (2006)

*Legend: X (match), - (no match), * (expert opinion)*

Table 4. *Technology overview (excerpt from technology assessment catalog)*

To obtain the classification, we searched the existing knowledge base for empirical evidence. Kumar and Benbasat (2006), for example, demonstrate that consumer ratings and reviews can improve the social presence and perceived usefulness of a shopping platform. Hence, we classified rating and review systems accordingly. As we only found empirical evidence for 10 of the 25 technologies, we screened practitioner reports to obtain more information about the technologies' impacts. For the search, we used terms and phrases that are conceptually related to the proposed selection criteria. For instance, we used the terms "fun", "enjoyment", and "entertainment" to identify technologies that have a potential impact on perceived enjoyment. In this way, we were able to additionally classify eight of the technologies. To verify and complete our classification, we furthermore consulted three domain experts. Together with the experts, we discussed the potential impacts for each technology. In cases where the experts agreed on an impact of a technology that we had not already identified in the literature, we added this information to our classification. We constrained our classification to contain only the basic values "match" or "no match" since any more detailed assessment would have been too subjective. However, the resulting classification is sufficient to support the identification of technology candidates in step 2. For this purpose, the catalog needs to be browsed for technologies that match the defined selection criteria.

Using the catalog excerpt from Table 4, our fictive company reduces the number of technologies to a set of 11 technology candidates, which match the criteria social influence or social presence.

4.3 Step 3: Evaluate and Select Technologies

In step 3, the social commerce technologies that best fulfil the selection criteria need to be identified and selected from the set of potential technology candidates. To achieve this task, a company has to establish a ranking of the identified technology candidates. As it still can choose between multiple candidates, a structured decision-making approach is needed to create such a ranking. Referring to the related domain of selecting enterprise software, decision-making techniques, such as WSM, AHP, and approaches based on fuzzy set theory, could basically be used to solve this kind of task (see section 2). However, each of these techniques comes with its own strengths and limitations (Jadhav and Sonar, 2009). While WSM, for example, is easy to use and well-known in practice, it requires a common numerical scaling

of the data and hence does not support the comparison of different types of technologies and selection criteria (Jadhav and Sonar, 2009, Kontio, 1996). AHP, in turn, is very powerful and can solve both qualitative and quantitative multi-criteria decision problems. However, due to the complex mathematical calculations and required number of pairwise comparisons, AHP is time-consuming and dependent on the support of a software tool (Forman and Gass, 2001, Jadhav and Sonar, 2009). Approaches based on fuzzy set theory in turn are designed to better support the vagueness and ambiguity in human decision making, yet they are difficult to compute and often unknown by practitioners (Jadhav and Sonar, 2009). During our action research project (see section 5), we observed that the ranking of the technologies can also be efficiently accomplished in an interactive discussion with experts. This procedure is less formal in nature but allows the decision makers to better exchange and reflect their arguments. Although our method is not restricted to a specific evaluation technique, a company should ensure that the preferred approach supports the selection of different technologies by multiple criteria.

All of the above-mentioned evaluation techniques require the decision maker(s) to comparatively rank the technologies according to the fulfilment of the defined selection criteria. For this task, detailed information about the technologies is required as input. To provide such information in an efficient manner, the assessment catalog contains faceted descriptions for all identified social commerce technologies. Referring to the findings of our literature review and the gathered expert statements, we describe the functionality, the potential impacts on the customers' buying behavior, and the corresponding layer of the social commerce reference model (used in step 4) for each technology in detail. Table 5 depicts the detailed description of rating and review systems.

Technology	Rating and review systems
Description of function	Rating and review systems enable customers to share their opinions about products and services they have purchased from a company. Other customers can then see this additional information on the company's website. [...]
Potential impacts	According to Kumar and Benbasat (2006), rating and review systems can increase the perceived usefulness and social presence of a company's website. As ratings and reviews are a type of social word-of-mouth, they can also increase the consumers' trust in the company (Hajli et al., 2013). Moreover, ratings and reviews affect the customers buying decision process regarding the product evaluations. In this way, they can also increase informational social influence (Kwahk and Ge, 2012).
Layer of reference model	Since they encourage customers to share and exchange information, rating and review systems target the conversation layer (Huang and Benyoucef, 2013a).
Examples	Amazon.com, BestBuy.com, eBay.com, Tripadvisor.com

Table 5. *Technology details (excerpt from technology assessment catalog)*

Based on the detailed descriptions, a ranking of the technologies can be established either by considering all selection criteria simultaneously or by creating separate rankings for each of the criteria and then consolidating them. After the ranking has been established, a company needs to select the final set of technologies. The basis for this decision inherently depends on the situational context of the company. Hence, no universally valid decision principles can be formulated. However, we can draw on the results of our action research project to identify decision principles that potentially can matter in practice. On the one hand, we found that technologies were excluded because their implementation costs would have exceeded the budget granted for the initiative (see section 5). To identify these costs, the company either has to search the market for suitable social commerce products that realize the desired technology or estimate the effort for the implementation of the technology as bespoke software. On the other hand, we found that some technologies were deliberately selected because the company already had suitable products in use and could leverage resulting synergies.

Using an interactive discussion round and the detailed descriptions as basis, our fictive company ranks each technology candidate according to the determined selection criteria. Taking into account its limited budget, the company decides to select the two highest-ranked technologies for each selection criterion.

4.4 Step 4: Verify Effectiveness of Technology Set

In step 4, it ought to be verified that the chosen technologies can be composed with each other. During our literature review, we identified a reference model suggesting that social commerce platforms are more effective if they cover four layers of social commerce-specific features (see section 2). We adopted the model as a benchmark to verify the chosen technology set against and to derive recommendations for complementary technologies. To facilitate the verification, the assessment catalog contains information about the layers of the reference model to which a technology contributes (see Table 5).

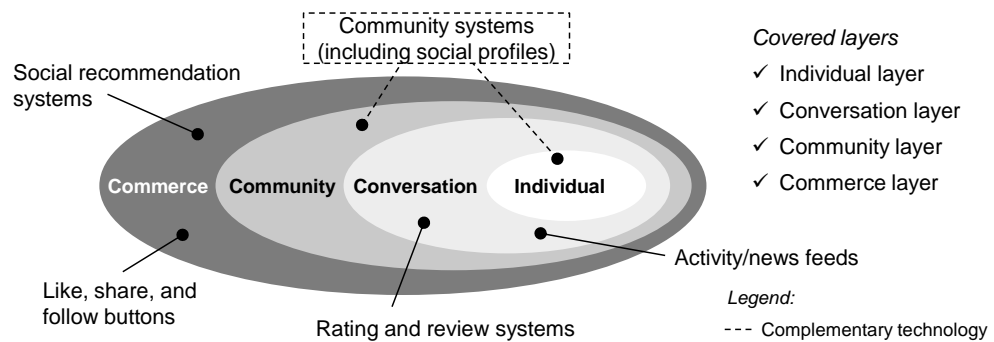


Figure 3. Example of an effective technology set (based on Huang and Benyoucef, 2013a)

Figure 3 depicts the technologies that our fictive company selects to realize its social commerce initiative. In step 3, the company selected four social commerce technologies, which contribute to the conversation and the commerce layers. To increase the effectiveness of its platform, the company decides to augment the technology set with an additional technology that targets the community and the individual layers. As depicted in Figure 3, the company extends the technology set with a community system that contributes to both layers. Note that a technology set does not necessarily need to cover all four layers, especially when a company already has implemented other social commerce technologies.

After verifying the technology set, a company can begin with the implementation and decide, for instance, if the chosen technologies should be realized by third-party products or by custom development.

5 Practical Application

In the early stages of design science research, examining a single (but realistic) business case is a recommended evaluation technique to observe an artefact in use and to obtain a proof of concept (Gregor and Hevner, 2013). For this purpose, we decided to perform an action research stage, in which we applied our method in a complex social commerce project of a world-wide leading German enterprise software company. The company operates an electronic marketplace as online sales platform for its software products and those of its partners. As the company wants to grow the ecosystem around its software products, it intends to offer an aesthetical shopping experience and continuously seeks to attract new customers to the platform. Following these goals, the company recently decided to start a social commerce initiative and was faced with the task of selecting adequate technologies for it. The company agreed to use our method to support the selection process and involved one of the method's designers as a guide into the project. Besides this person, the project team consisted of five platform specialists, three platform marketers, and three developers. All had several years of expertise in their fields.

To select social commerce technologies, the project team closely followed the proposed procedure model and completed all four steps in sequence. In the first step, the team defined the selection criteria. As proposed by our method, the team agreed to focus on the factors of social commerce technologies that influence the customers' buying behavior. This decision was in accordance with the company's primary business objective to increase the selling of products on its platform. The project members extensively discussed which of the proposed selection criteria best fit the company's business strategy. Central elements of the strategy were to provide a best-possible shopping experience and to increase the

reputation of its marketplace. Hence, the team decided to focus on technologies that support one or more of the three factors “perceived ease of use”, “perceived usefulness”, and “trust”. The first two were selected to target the shopping experience, the latter was selected to increase the reputation of the platform. Factors such as perceived enjoyment or social influence/presence were deliberately excluded as they did not clearly fit the company’s business model (i.e., the selling of enterprise software packages). In the second step, the technologies satisfying the defined selection criteria had to be identified. The project team browsed the technology assessment catalog for technologies that match the selection criteria. In so doing, the project team was able to reduce the set of applicable social commerce technologies to 11 potential candidates. To conduct the detailed assessment in the third step, the project team agreed upon an interactive discussion in which the technologies were ranked based on an expert consensus. This procedure was deemed preferable as the team members had little or no experience with structured decision-making techniques such as AHP. An interactive assessment also helped the team members to reflect and clarify their own preferences. In the discussion rounds, the set of potential technology candidates was further reduced. Using the detailed information of the technology assessment catalog, the team established separate rankings for each of the selection criteria. The technologies were then prioritized according to their potential fulfilment of the selection criteria and the estimated implementation effort. Taking into account a maximum amount of person-days that was granted for the implementation of the social commerce initiative, the team used the prioritization to reduce the candidates to a set of five technologies (see Figure 4). The set covered the specified selection criteria completely. Its implementation was estimated to require about 100 person-days of development time.

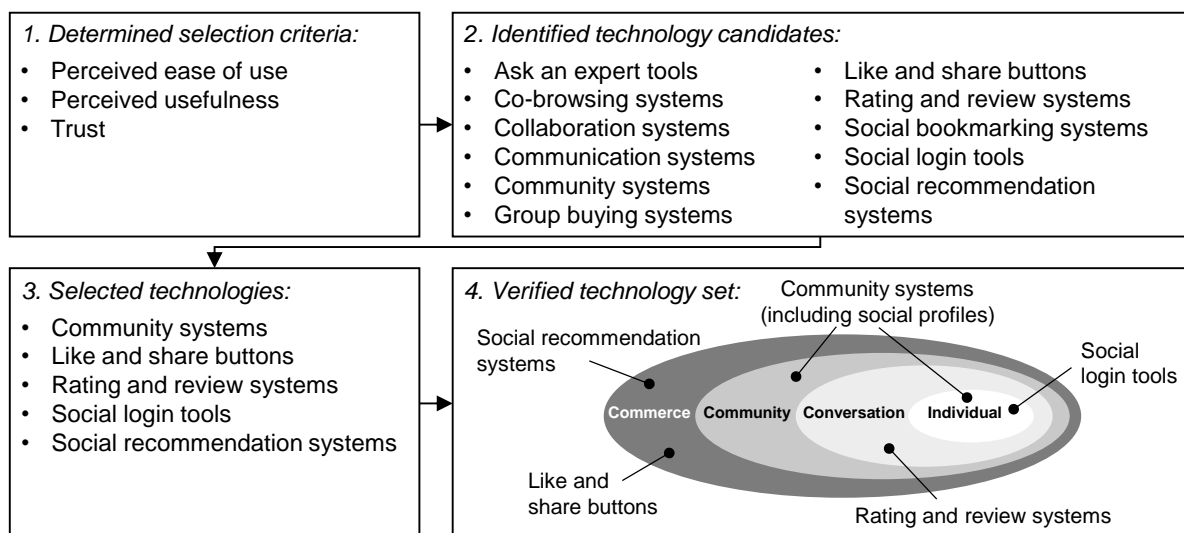


Figure 4. Results of each step of the procedure model

In the last step, the remaining five technologies were verified for comprehensiveness according to the layers of the proposed reference model. It turned out that the chosen set of technologies covered all four layers of the reference model and consequently formed a theoretically effective social commerce platform. The result reinforced the decision to choose the selected technologies. Accordingly, the team members decided to adopt the selected technologies. As our interviews during a retrospective meeting showed, the team members were satisfied both with the achieved results and the applicability of the proposed method. The method was found to effectively support the selection process and to be easily useable. Especially the information contained in the technology assessment catalog was judged to be an important measure to facilitate the decision process. The different steps of the procedure model were moreover found to support a systematic reflection of the decision, starting with the selection criteria to the characteristics of individual technologies and their interaction in the resulting social commerce platform. Altogether, the conducted evaluation attests the practical applicability of our method and indicates that it can indeed contribute to a more efficient selection of social commerce technologies.

6 Discussion and Conclusion

Motivated by the need to better support social commerce initiatives, we presented a new method for the selection of social commerce technologies. The method is based upon a systematic, tailor-made decision-making procedure and provides two contributions: (i) a procedure model to operationalize the process of selecting a set of complementary social commerce technologies; (ii) a catalog of available social commerce technologies and their potential impacts on the customers' buying behavior. Both elements of the method have been evaluated in a complex organizational setting. The conducted evaluation indicates that the method is applicable in practice and effective in supporting the selection of multiple complementary social commerce technologies.

The results of our research endeavor have implications for academia as well as practice. For academia, we show how to operationalize and formulate the problem of selecting adequate social commerce technologies as a systematic decision-making procedure. With the developed technology assessment catalog, we moreover provide a unique overview of existing social commerce technologies and their potential impacts on the customers' buying behavior. By providing an initial instrument to support a goal-driven design of social commerce initiatives and by establishing a consolidated information base about available social commerce technologies and their impacts, we contribute to advancing the state of research in the still premature social commerce domain. In addition, we also provide a novel contribution to the field of software selection. The procedure proposed in the work at hand is distinctly different from existing software selection approaches that have, amongst others, been developed in the enterprise software domain. Other than existing approaches, it supports the selection of multiple complementary technologies and, to that end, is designed to handle a large set of functionally diverse technology candidates as input. Although we created the method having the social commerce domain in mind, the basic concept might be transferable to other realms such as the enterprise architecture domain, where it could support a goal-driven design of application landscapes that inherently consist of multiple technologies.

For practice, we deliver a readily applicable method to select social commerce technologies. It has been designed to support the persons responsible for the planning and design of social commerce initiatives in companies. Due to constituents such as the technology assessment catalog, the method was perceived as efficient and easily useable by this target group during the conducted evaluation. Compared to the current state of the art, we thus expect it to deliver process improvements and to facilitate the implementation of social commerce initiatives. Although we evaluated the method in a complex project with multiple goals and selection criteria, we deem it to be equally useful for smaller social commerce initiatives. Such initiatives are often led by non-experts, who have limited social commerce expertise and hence might particularly benefit from the knowledge encapsulated in the technology assessment catalog.

However, we will have to conduct further evaluations of our method to verify such claims. As we only concentrated on examining the feasibility of the method so far, we have not yet gathered reliable empirical data on its effectiveness and efficiency. We plan to gather such data in future iterations of our research project. Furthermore, we found several points for improvement during our action research project that we intend to address. On the one hand, we plan to extend the technology assessment catalog with a detailed survey instrument to systematically support the determination of relevant selection criteria. On the other hand, we intend to search for additional selection criteria that might be of relevance and include them into the technology assessment catalog. Furthermore, we plan to extend the technology assessment catalog with additional technologies and to conduct empirical evaluations on their fulfilment of the identified selection criteria. Building upon this basis, we also intend to develop a systematic taxonomy of social commerce technologies. To give more precise recommendations on the different decision-making techniques, we finally need to experiment with structured (yet efficiently applicable) decision-making approaches such as AHP in future design iterations. Notwithstanding these limitations, the presented method already provides a theoretically substantiated, systematic procedure to select social commerce technologies. It might hence present a starting point to evolve social commerce initiatives from primarily technology-driven endeavors into goal-driven, strategically managed processes.

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