

# Social Software in New Product Development – State of Research and Future Research Directions

*Completed Research Paper*

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## Abstract

Product development becomes increasingly collaborative and knowledge-intensive in today's industry. To gain competitive advantage an effective usage of information systems in new product development (NPD) is needed. Social software applications indicate further potential for usage in NPD, the so called "Product Development 2.0", which is poorly understood in research so far. The purpose of this article is to point out the current state of research in this area by means of a literature review, after which research gaps and future research directions are identified. The results indicate that social software applications are suitable to support tasks in all phases of the NPD process, but influencing factors and effects of the identified social software usage in NPD are poorly understood so far.

## Keywords

Social software, new product development, weblog, wiki, social network, literature review, research agenda

## Introduction

To gain and sustain a competitive advantage in a mass-customized, global market, organizations face tremendous challenges. Increasing market dynamics, higher product complexity, increasing customer demands, as well as a stronger spatial distribution face the need for a flexible, site-specific and cross-company cooperation in product development (Bhatt and Ved 2013). In such an environment, rapid, frugal and effective new product development (NPD) has been identified as a source of competitive advantage (Merminod et al. 2012). To use these competitive advantages the product development process becomes increasingly collaborative and comprises various tasks that involve extensive knowledge exchange and communication among geographically distributed teams (Filiari 2013). So far, no specific platforms exist, that can foster collaboration and knowledge exchange within product development. Accordingly, an important question for IS researcher and practitioner is how IS can improve new product development (NPD), in terms of knowledge exchange and communication. Due to its characteristics, social software may have further potential for usage in the product development context (Bertoni and Chirumalla 2011). This is indicated by extensively explored applications of social software in knowledge management, project management and corporate communications. Furthermore social software applications are already used in NPD. Hinchcliffe (2007) calls this trend "Product Development 2.0".

According to this growing emphasis on social software usage in new product development, research needs to understand the impact of social software usage within NPD. More precisely researchers and managers need to understand what makes these tools relevant and practical for individuals in organizations. Therefore an understanding of current and future application areas for social software in NPD is an important but yet insufficiently researched area. In this article we focus on this gap. Therefore, our main contribution is to shed light on the state-of-the-art of social software usage in NPD and set up a research agenda to provide guidance for future research. As mentioned by Bonney and Jaber (2014) a research agenda will help to (1) report on past results, (2) identify and structure the gaps in current knowledge and (3) provide guidance for future research. According to that aim the following research questions are examined in this study:

**RQ1:** Which are potential application areas of social software in new product development?

**RQ2:** Which research gaps in the area of social software applications in new product development exist and how can they be addressed?

To answer the questions above, this paper is organized as follows: In the next section we briefly introduce new product development and social software. Afterwards the related research will be presented by conducting a systematic literature review (RQ1). Finally, we discuss our findings, illustrate limitations and conclude by highlighting future research directions (RQ2).

## Background

Following Webster and Watson (2002) a review paper should provide elaborate definitions of key variables of the review and should set the boundaries on the review. In this paper, key variables are “new product development” and “social software”, which are presented in the following.


### *New Product Development*

Product development encompasses all technical, market and production-oriented activities from the perception of a market opportunity to the introduction of a differentiated product, that is aligned to the targeted transformation of an idea into a goods or service combination (Cooper 2003; Krishnan and Loch 2005).

NPD can furthermore be defined as a sequence of phases or steps with related tasks or activities, applied by an enterprise, in order to design and implement a marketable product (Ulrich and Eppinger 2012). This process includes planning, restructuring and organizational activities of product development and is divided into several phases; each phase is aimed at achieving a defined objective (Rafinejad 2007). As an interdisciplinary field, the phases of product development are characterized by a functional and cross-sectoral integration of a variety of actors (Chen et al. 2003). The first directly involved divisions (internal actors) are research, development, production, marketing and sales (Ulrich and Eppinger 2012). In addition, external stakeholders, such as customers, suppliers and external service providers, may be involved in the process.

For a description of the product development process, the literature contains a number of phase models, which differ in the level of detail, development context and the logic of phase sequence (Aw 2005). Over time, several generations of process models have emerged. From classical sequential phase models with defined phase transition criteria (phase-review or stage-gate-models; Cooper 1990), to flexible iterative processes with simultaneously running, collaborative activities (Dahan et al. 2010). The approaches vary in terms of processes and characteristics. However, a minimum consensus can be determined which leads to five basic stages within the NPD process (Aw 2005). These five phases and the associated tasks and stakeholders are summarized in Figure 1. Depending on the product, the activities can vary widely in phases, so here is an abstract and general representation of the phases and activities.

Phase	Ideation	Concept Design	Development	Testing	Introduction
Characteristic Tasks	<ul style="list-style-type: none"> <li>- Situation and problem analysis</li> <li>- Idea generation and collection</li> <li>- Idea screening</li> <li>- Idea assessment</li> <li>- Idea selection</li> </ul>	<ul style="list-style-type: none"> <li>- Market and product analysis</li> <li>- Specification of product requirements</li> <li>- Development of product concept</li> <li>- Product and project planning</li> </ul>	<ul style="list-style-type: none"> <li>- Technical product development / service implementation</li> <li>- Detail planning of product specific processes</li> <li>- Marketing and test planning</li> </ul>	<ul style="list-style-type: none"> <li>- Product test</li> <li>- Market- / field test</li> <li>- Production test</li> </ul>	<ul style="list-style-type: none"> <li>- Process implementation for production and market introduction</li> <li>- Production start</li> <li>- Market launch</li> <li>- Test and review</li> </ul>
Stakeholder	<ul style="list-style-type: none"> <li>- R. &amp; D</li> <li>- Innovation Mgt.</li> <li>- Marketing</li> </ul>	<ul style="list-style-type: none"> <li>- R. &amp; D</li> <li>- Marketing</li> </ul>	<ul style="list-style-type: none"> <li>- Engineering / Construction</li> <li>- Production</li> <li>- Marketing</li> </ul>	<ul style="list-style-type: none"> <li>- Engineering / Construction</li> <li>- Production</li> <li>- Marketing</li> </ul>	<ul style="list-style-type: none"> <li>- Engineering / Construction</li> <li>- Production</li> <li>- Marketing / Sales &amp; Distribution</li> </ul>

 Smooth and iterative transitions between phases are possible

**Figure 1.** New product development process

These NPD phases and the related characteristic tasks provide the basis for an in-depth analysis of potential application areas of social software applications. Therefore social software applications and application scenarios within the business context are presented in the following.

### Social Software

Social software is understood as web-based application systems that allow users to interact with each other through communication, cooperation or collaboration in the long term. Created content and involved users are networked together continuously. Created content can be shared, reused or remixed (Klein 2012; Kaplan and Haenlein 2010; Giuffrida and Dittrich 2013).

With that definition social software builds on the ideological and technological foundations of Web 2.0, that allow the creation and exchange of User Generated Content (Kaplan and Haenlein 2010). Due to the relatively broad definition of social software a wide range of associated application systems can be found in the literature (Kaplan and Haenlein 2010). To structure them they can be categorized into classes of applications (Avram 2006). In this study, we follow a narrow view that distinguishes the three application classes weblogs, wikis and social networking services. These classes constitute a minimum consensus of existing social software classifications (Klein 2012). In the following we briefly introduce these three application classes and their typical functions.

**Weblogs** (blogs) are websites where often subjective contents (e. g. reflections, comments) are published. These author-centered, date-stamped entries (blog posts) are presented in a reverse chronological order (Avram 2006). In addition to writing, archiving and searching of entries, blogs usually have features that support the interaction between readers and authors. A **wiki** is a collection of linked web pages, which is designed as an open system to allow any user to add, remove and change text-based content (Leuf and Cunningham 2001; Kaplan and Haenlein 2010). Unlike blogs in a wiki objective facts are in the foreground. Content will be created by the user community, cooperative and validated. **Social networking services** (SNS) are web-based services that support the creation of social networks in the home or business environment (Kaplan and Haenlein 2010). A basic function of SNS is identity management which is used for self-presentation by creating and managing a personal, public or semi-public profile (Boyd and Ellison 2008). Profiles allow users of the SNS to identify each other and articulate a list of users with whom they share a connection. User can also view and traverse their list of connections of those made by others within the system (Boyd and Ellison 2008).

For social software usage in the business environment the term Enterprise 2.0 was coined by McAfee (2006), who describes the "use of social software platforms within or between companies and their partners or customers". According to that definition, we identified three different **application scenarios** (internal closed; internal (semi-)open; external (semi-)open). They can be distinguished according to the involved user group (employees, customers, business partners) and the location of the application (intra-/inter-organizational, external). The application scenarios are briefly introduced in the

following. Internal, closed: The social software applications are located on the corporate network (intranet), the access is limited to the employees of the company (Klein 2012). Internal, (semi-)open: The applications are localized on the corporate network. Next to employees also external stakeholders, such as business partners or customers are involved. In the open scenario no restriction of access to external users takes place, whereas in the semi-open scenario, only selected users can participate (Klein 2012). External, (semi-)open: In this scenario, companies participate on social software applications, located outside the organization. This can be applications located on the Internet (open scenario) or on other companies' intranet (semi-open scenario).

The presented social software application classes provide the basis for an in-depth analysis on how these classes can be used to support activities or tasks within the new product development process. Furthermore, task coverage may differ by means of the used application scenario, which also needs to be investigated. Therefore we conducted a literature review for which the methodology is presented in the following section.

## Research Method

To answer the research questions we conducted a literature review, having the general aim to explore and understand the existing research in the field of social software usage in NPD. To explore the extent to which social software supports NPD, we analyze social software usage by phase reference and by application class and application scenario. In the following, we present the chosen research method; the section is divided into data collection and analysis.

### Data Collection

According to the aim of the review we intend to accumulate a relatively complete census of relevant literature. Therefore, the major scientific databases in the field of computer science economy (Knackstedt and Winkelmann 2006) provide the basis for data collection. Depending on available access, the databases were scanned successively to cover a wide range of publications in the research field. We included English and German publications in our review because the authors are fluent in English and German. Furthermore English is the predominant academic language. Hence, it can be assumed that most relevant literature is published in that language. We used the keywords presented in Figure 2 and their German equivalents. These search terms are derived from literature and the definitions presented in section 2. The query results were reviewed using title and abstract, whereby 126 articles appeared to be relevant. Figure 2 provides an overview of keywords and databases, we used for data collection.

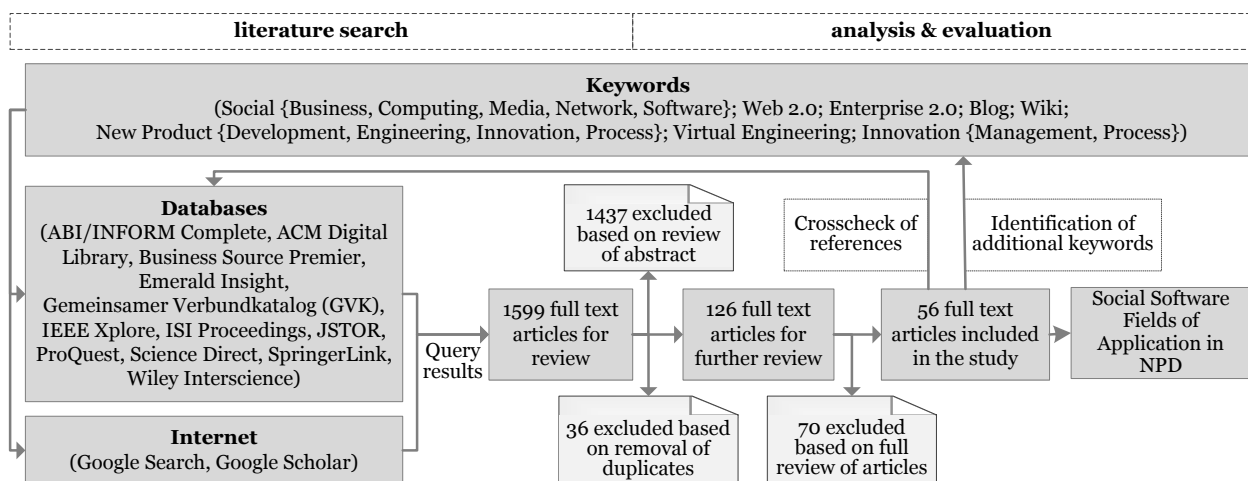


Figure 2. Research framework

After rough selection of literature we analyzed the full text, whereby 70 articles have been excluded because they did not contribute to our units of analysis which are described in the data analysis section. Finally 33 articles considered as relevant and were included in the review. In a next step we reviewed references of identified articles, to determine prior contributions, which were not found during the first search. Furthermore we examined if there are newer articles that cite the articles in our list (cutoff date: December 15th 2013), whereby 23 additional contributions have been identified. Leedy and Ormrod (2014) noted that search is near completion when one discovers that new articles only introduce familiar arguments, methodologies, findings, authors, studies. Following this advice, overall 56 articles were identified, which were analyzed for further study.

## Data Analysis

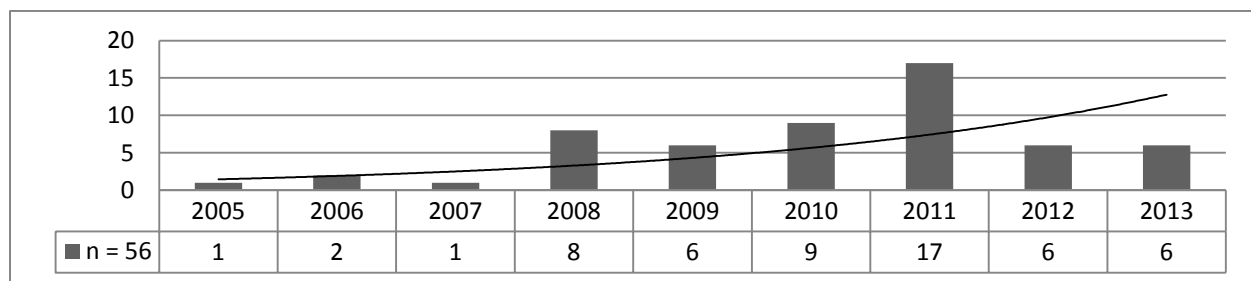
In order to identify social software application areas in NPD, we analyzed the selected 56 contributions in two steps: 1) identification of NPD tasks, and 2) assignment of social software application classes and application scenarios that support these tasks.

According to 1) we performed a content analysis to identify NPD tasks in the literature. In this step we have manually extracted in vivo codes that emerged directly from the data material. With progress of the evaluation, these codes were step-by-step expanded, refined and abstracted. To accumulate a relatively complete census of relevant tasks, for each task a minimum of one reference in the literature was sufficient. Furthermore we used the presented five NPD phases (see figure 1) as a classification scheme. Finally 33 NPD tasks are synthesized from literature by discussing and grouping each identified task to the related process phase, as shown in the first (NPD Phase) and second (NPD Task) column of Table 2.

Considering 2) we added further dimensions (application class; application scenario) to the concept matrix. These categories are used to structure the presentation of the results and to summarize major findings and insights. In this sense, we analyzed for each of the 33 identified NPD tasks by which application class this tasks are supported. Furthermore we examined, in which application scenario these application classes are located. The assignment to application scenarios is based on the descriptions of these scenarios in the background section. The data analysis was performed by two researchers independently. Then a comparison of the two classifications was realized and where there was a discrepancy, verification was jointly conducted to reach consensus. The results of this step are shown in the third column (Social Software Application) of Table 2.

## Results

Beginning with some descriptive findings, we highlight the distribution of articles by year, NPD process phase and application class. Afterwards we present our findings on social software support for specific NPD tasks that we summarized within a concept matrix (Table 2). Finally we summarize major findings and insights with regard to application scenarios. As a result of the literature review we investigated 56 contributions that relate to a period from 2005 to 2013, with an increase in the number of publications observed in 2008 (Figure 3).



**Figure 3.** Frequencies of contributions by publication year

Table 1 presents the distribution of articles in general and the usage of application classes in particular, both by phase reference. Concerning the NPD process, it can be observed that social software is used in all phases of the NPD process. The vast majority of contributions covered areas related to ideation (47 contributions, 84 %) and concept design (22 contributions, 39 %). In these early stages a collaborative development of ideas and concepts is in the focus. This also includes the involvement of employees and customers. In contrast, applications in development (11 contributions, 20 %) and testing (9 contributions, 16 %) are only partially addressed so far. As a first result it can be stated that most research focuses on particular process steps, which becomes clear by means of an author-centric overview. Only in a few cases (e. g. Sigala 2012) an examination across several NPD phases takes place.

NPD Process	No. of Articles			
	Overall	Weblogs	Wikis	SNS
Ideation	47 (84%)	19 (33 %)	13 (23 %)	21 (38 %)
Concept Design	22 (39%)	9 (16 %)	8 (14 %)	11 (20 %)
Development	11 (20 %)	4 (7 %)	8 (14 %)	3 (5 %)
Testing	9 (16 %)	5 (9 %)	1 (2 %)	6 (11 %)
Introduction	13 (23 %)	10 (18 %)	3 (5 %)	4 (7 %)
Total	56 (100 %)	26 (46 %)	16 (29 %)	40 (71 %)

Note: Some articles are counted more than once because they cover more than one issue. n = 56

**Table 1.** Distribution of articles by phase reference and application class

Considering the application classes it can be observed, that all focused application classes support product development activities. The class of SNS is the most frequent (40 contributions) followed by blogs (26 contributions) and wikis (16 contributions). Furthermore, weblogs and SNS are used in all phases, while wikis are not used for testing and introduction. Even weblogs and wikis show differences in terms of task coverage. Application areas of weblogs are primarily found in ideation and introduction, while potential applications in the phases located between them have been poorly studied. Within ideation, blogs can be used to identify needs and preferences of customers and to discover new trends. Furthermore, blogs can generate attention before market launch of a new product (Kaplan and Haenlein 2010). Wikis are however been discussed mainly in the context of ideation, concept design and development, which is related to the possibility of collaborative content creation through co-authorship (Bertoni and Larsson 2011). SNS are mainly discussed for usage as an innovation platform or for idea competition in the early stages, while SNS usage for development and introduction has, however, been addressed only rudimentary (de Hertogh et al. 2011).

In addition to a general allocation of social software applications to NPD process steps, we analyzed in detail which tasks are supported by these applications (Table 2). Based on a concept matrix, for each phase, the areas of application (NPD tasks) are assigned to those application classes and application scenarios that are discussed in the literature.

Phase	NPD Task	Social Software Application									
		Weblog			Wiki			SNS			
		1	2	3	1	2	3	1	2	3	
Ideation	A1	Identification and analysis of market trends and customer needs	-	-	✓	-	-	-	-	✓	✓
	A2	Idea generation and collection	✓	✓	✓	✓	-	-	✓	✓	✓
	A3	Structuring and linking of content for idea generation	✓	-	-	✓	-	-	✓	-	-
	A4	Identifying lead users for idea generation	-	-	-	-	-	-	✓	✓	✓
	A5	Commenting on ideas	-	✓	-	✓	-	-	✓	✓	-
	A6	Specifying and developing ideas	✓	✓	-	✓	-	-	✓	✓	✓
	A7	Identification and assignment of experts for detailing and evaluation of ideas	-	-	-	✓	-	-	✓	-	-
	A8	Idea assessment	✓	-	-	✓	-	-	✓	✓	-
	A9	Identifying and ranking of ideas	-	-	-	✓	-	-	✓	✓	-
	A10	Documenting the evolution of ideas	-	✓	-	-	-	-	-	-	-
Concept Design	B1	Competency-based compilation of development teams	-	-	-	-	-	-	✓	✓	✓
	B2	Product requirements identification and specification	-	-	-	✓	✓	-	-	✓	✓
	B3	Mapping the request context	✓	-	-	✓	-	-	✓	-	-
	B4	Documenting decisions (design rationale)	✓	-	-	✓	-	-	✓	-	-
	B5	Identify and cross-linking of content and people to concept related topics	-	-	-	-	-	-	✓	-	-
	B6	Comment the product specification and concept-related topics	-	-	-	✓	-	-	-	✓	-
	B7	Develop and specify product concepts	-	-	-	-	✓	-	-	✓	-
	B8	Rate of product concepts	-	-	-	-	-	-	-	✓	-
	B9	Documenting and reflecting phase results	-	-	-	✓	-	-	-	-	-
Development	C1	Documenting and annotating problems within development stage	-	-	-	✓	✓	-	✓	✓	-
	C2	Documenting product components	-	-	-	✓	-	-	-	-	-
	C3	Documenting and communicating changed requirements	✓	-	-	✓	-	-	-	-	-
	C4	Version management	-	-	-	✓	-	-	-	-	-
	C5	Documenting and communicating development progress	-	✓	-	✓	-	-	-	-	-
Testing	D1	Reviewing and rating of product prototypes	-	-	✓	-	-	-	✓	✓	✓
	D2	Determine the willingness to purchase and pay	-	-	-	-	-	-	-	✓	-
	D3	Review the Marketing Plan	-	-	-	-	-	-	-	✓	-
Introduction	E1	Identifying opinion leaders for product marketing	-	-	-	-	-	-	-	-	✓
	E2	Generate attention in preparation for the launch	-	✓	✓	-	-	-	-	-	-
	E3	Providing information on new products and product features	✓	✓	✓	-	-	-	-	-	-
	E4	Documenting introduction progress	✓	-	-	-	-	-	-	-	-
	E5	Source of information for the evaluation of newly introduced products	-	-	✓	-	-	-	-	✓	✓
	E6	Identifying problems that arise in the introduction phase	-	-	✓	-	-	-	-	-	-
<b>Task support:</b>		✓ = task is supported - = task is not supported	<b>Application Scenario:</b>			1 = internal, closed 2 = internal, (semi-) open 3 = external, (semi-) open					

Table 2. Social software application areas in NPD

A more detailed examination based on application scenarios (see Table 3) shows that social software usage in the **internal, closed scenario** primarily addresses the initial phases. Internal, company-wide application scenarios can especially help to involve departments into product development, which have direct contact with end customers (customer service or sales). In the internal closed scenario, social software usage for testing and introduction is little considered in current research.

NPD Process	application scenario		
	internal closed	internal (semi-) open	external (semi-) open
Ideation	19 (34 %)	21 (38 %)	16 (29 %)
Concept Design	10 (18%)	11 (20 %)	6 (11 %)
Development	7 (13 %)	6 (11 %)	0 (0 %)
Testing	2 (4 %)	4 (8 %)	6 (11 %)
Introduction	4 (8 %)	4 (8 %)	9 (16 %)
Total	26 (46 %)	26 (46 %)	21 (38 %)

Note: Some articles are counted more than once because they cover more than one issue. n = 56

**Table 3.** Distribution of articles by phase reference and application scenario

Application areas in the **internal (semi-) open** scenario are relatively extensive addressed (26 articles), where research focuses mainly on ideation, concept design and testing. Especially in these phases the knowledge and experience of customers is needed and confirms the increasing relevance of external actors as a source of innovative capacity for firms (Antikainen et al. 2010). In the **external scenario** social software usage primarily addresses ideation and introduction. These stages have a strong connection to marketing-oriented activities. They cover tasks which are usually applied in the context of market research and analysis (eg. A1, E2, E3). The literature analysis also shows that the involvement of external actors (especially customers to generate feedback on product ideas or concepts) is a field of study, which is already widely discussed in current research (Bertoni and Chirumalla 2011). According to that, customer-specific knowledge can be integrated in the NPD process (Dahl et al. 2011). In contrast the external scenario is not discussed for the development stage, which is not surprising by means of confidentiality at this stage. In addition, wikis are not used for NPD related tasks in an external scenario, which is also not surprising by means of the wiki characteristics as a tool for documenting product related information, which traditionally refers to internal activities.

## Discussion and Future Research Opportunities

Our findings show that social software can be used in all NPD process phases. However, weblogs, wikis and SNS differ in terms of task support. Social networks can be used especially in context of ideation. With functionalities such as network awareness and context awareness the knowledge and experience of customers and partners can be considered for generation and evaluation of product ideas. Wikis are used in the internal scenario. With functionalities such as documenting and structuring of information internal stakeholder can create, organize, distribute and search for product related knowledge. Weblogs are mainly used to draw attention on product related activities. For example the release of information such as technical specifications, images or videos could facilitate the market launch of a new product within the introduction phase. Moreover, previous studies have mostly focused on the early stages of the NPD process (ideation and concept design). The identified tasks within these stages refer mostly to collaborative development of ideas and concepts. In that sense, social software aims at a cross-linking of content and people to make knowledge and knowledge sources visible and available for product development activities (Larsson et al. 2008). Here, activities are in the foreground, which are characterized by a high degree of creativity combined with low structuring and formalization. This low structuring and formalization of the process as well as the importance of its flexibility makes loose-connections or weak ties between product development stakeholders necessary. Especially SNS support these weak ties with functionalities such as contact management, expert search and information exchange (Richter and Koch 2008). This cross-linking leads to an increasing awareness of information and knowledge flows throughout the entire product development process (Bertoni et al. 2012). Moreover, social software applications support the documentation and communication of unstructured data. In that sense social software can serve as a source of information that can be integrated with other information systems (e. g. Product Lifecycle Management Systems) that are already established in NPD (Merminod et al. 2012). Summarizing the aforementioned results, current literature on social software usage in NPD has three gaps:



- Previous studies on social software usage mostly focus on particular stages of the NPD process, failing to discuss a phase transcend applicability of social software within NPD. In that sense current literature does not present a complete picture of application areas for social software in NPD.
- The study also accentuates the importance of effects that result from a social software usage in NPD. For example, social software can shorten lead-time or increase the quality of design decisions (Bertoni et al. 2012). So far, no studies have been identified that comprehensively deal with the effects of social software in NPD.
- The investigation has shown that certain task characteristics promote the use of social software (e. g. a high degree of creativity and interaction has a favorable influence on social software usage). To take advantage of the opportunities being offered by these influences, a better understanding of favorable as well as inhibitory influencing factors is required.

These gaps raise some opportunities for future studies. In the following, we provide a roadmap for future research on social software usage in NPD, concerning these three gaps mentioned above. As recommended by Truch et al. (2000) a research agenda should be comprised of research themes, the nature of the deliverables and the research process.

### ***(i) Phase Transcend Research Approach***

One conclusion is that current literature focuses on the early stages of the NPD process (ideation and concept design). Therefore it is not surprising that the vast majority of NPD tasks that are supported by social software relate to these stages (19 identified tasks from overall 33; 58 %). However, it can be suggested, that more tasks in the later stages exist, that can be supported by social software applications. To identify them, further research on social software usage in these stages is needed. Especially it should be examined how wikis could be used for testing and introduction, because so far no tasks were identified. Further research is also required on SNS usage for development and introduction. Regardless of the support of individual tasks in particular phases it should be examined, whether social software has to meet additional requirements when it its used phase transcend. Because current literature does not provide sufficient information, social software usage should be examined in practice. Therefore the question arises whether the type of business or industry has an influence on the suitability for social software usage in NPD. In order to fill these research gap our first future research question (FRQ) is:

**FRQ1:** Which companies and industries are particularly suitable for social software usage in NPD?

Due to the limited amount of research on social software usage in NPD in practice the purpose of future research should be theory building. Thus, a central challenge is to examine social software usage in NPD in an empirical study that should have a cross-company and cross-industry focus. Further research on the suitability of social software for specific industries may indicate those industries in which social software usage in NPD has an impact on firm's outcome.

### ***(ii) Research on the Value Proposition of Social Software Usage in NPD***

Every business activity's fundamental goal is to increase the firm's value. However, so far no studies exist that provide evidence of the relationship between social software usage in NPD and a firm's value added. Consequently it would be useful to investigate whether the usage of social software application classes in NPD has an impact on the NPD process outcome. As a result another future research question can thus be formulated as follows:

**FRQ2:** How does social software usage contribute to NPD process outcome?

To evaluate the impact of social software usage on NPD, both effort and benefit effects need to be taken into account to assess the value added. Here effects should be focused, that refer to the field of NPD, because effects of a social software usage in general are adequately researched. More precisely it needs to be investigated, for which application areas social software usage has an effect related to organizations in general and individual NPD stakeholders in particular. In that sense the areas of application we investigated in this study provide a basis for an in-depth analysis. Moreover it needs to be examined which NPD related task (see Table 2) leads to which effect. Further research on effort and benefit effects

may help practitioners to assess the impact that might result from social software initiatives within their organizations.

### ***(iii) Research on Favorable or Inhibitory Influencing Factors***

Because social software applications depend highly on network effects (Parameswaran and Whinston 2007), influencing factors that can promote or inhibit social software usage in NPD also have to take into consideration. These relate, for example, to the organizational, technological, cultural and legal context (Parameswaran and Whinston 2007). So far no research really studies the relationships between social software and the influencing factors that may serve as a facilitator or a barrier on usage of these applications within NPD. This gap can trigger our future research interest in the following questions:

**FRQ3:** How can favorable factors be promoted to stimulate the acceptance and usage of social software in NPD?

**FRQ4** How can inhibitory factors be reduced to prevent the declination and non-usage of social software in NPD?

To answer these questions factors from the research domain social software as well as from the field of product development need to be taken into account. Further research on influencing factors may help researchers to understand why users either accept or resist using social software (Kim 2012). It may also help to identify different ways to improve and support the users' acceptance of social software applications within NPD. This will help in developing strategies to promote the use of social software and direct the appropriate use of developed applications (Kim 2012).

## **Limitations**

Despite the aim that a complete as possible amount of literature was intended, we acknowledge that not all existing contributions to social software usage in NPD may be identified and analyzed. The review is limited by the search terms. As stated in the results section, some social software applications in NPD have a strong connection to marketing related activities. Adding some marketing related search parameters to the investigation may lead to further relevant contributions. In this study we used articles in English and German because the authors are happen to be fluent in English and German. Furthermore publications in other languages should be included in future, to identify further relevant contributions. Finally, the inclusion of contributions into our study was based on our subjective judgment. Therefore future studies should be conducted to corroborate our findings. Nevertheless, the amount of identified literature should constitute a solid basis for research. Given that and the caution, care and formal procedures used by the researchers, these limitations do not diminish the findings or the value of the study significantly.

## **Conclusion**

This study aimed at investigating potential usage of weblogs, wikis and social networking services in new product development processes by conducting a rigorous comprehensive literature review, resulted in a list of 56 articles (RQ1). The presented study provides theoretical findings on potential applications, application classes and application scenarios of social software to support NPD. The results show that social software can foster an enterprise-wide communication and cross-interaction of stakeholders in the execution of product development activities. Furthermore SNS usage leads to an integration of customers and partners in the NPD process which may improve the organizational knowledge base in terms of market demands and customer needs. According to that, social software has the potential to make the product development process more open to its stakeholders by means of awareness on NPD activities and knowledge sources. In addition social software usage may help to respond faster and more flexible on changed market demands, that can be identified based on the data provided by social networking services and weblogs. But the still limited state of knowledge in the research field raises further research

opportunities. Hence, based on our study results, we recommend implications for further research (RQ2). Especially influencing factors and effects of the identified social software usage in NPD are poorly understood so far. Furthermore a need for an empirical phase-comprehensive analysis was pointed out, to corroborate our theoretical findings and gain new insights to the research field. According to that, the steps of the presented research agenda should be conducted so that the highlighted gaps in the knowledge base could be closed.

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