

CUSTOMER INVOLVEMENT IN CO-DEVELOPMENT IN B2B MARKETS: LITERATURE REVIEW ON KEY CONTRIBUTIONS AND SUCCESS FACTORS

ABSTRACT

In B2B markets, companies often collaborate with customers in their new product, service and solution development processes. The research findings on customer involvement in co-development are scattered into innovation, management and marketing literatures and thus, the best practices behind successful customer involvement are vastly unknown. This study gathers the contributions made on customer involvement in B2B markets by conducting a systematic literature review. Furthermore the study develops a model of successful customer involvement in B2B markets. The findings reveal that selection of the customer partners, management of the co-development process and development of internal co-development capabilities are critical for successful customer involvement. These findings increase understanding of customer involvement and offer managerial implications for successful customer involvement.

KEYWORDS: co-development, customer involvement, B2B markets, business-to-business markets

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INTRODUCTION

As the global competition increases, companies are seeking new ways to develop better products. In B2B markets companies are increasingly collaborating with their customers in new product and service development processes to get competitive advantage and create innovations that better match customers' needs. Thus, many capital goods are developed in close collaboration with customers (Windahl & Lakemond, 2010).

The value of interacting closely with customers during innovation process has been acknowledged years ago (Von Hippel, 1986). Still companies need more information about the best practices for co-innovation before they can successfully involve their customer into their innovation processes. However, this area of research is only narrowly addressed in existing studies and more research is called for shedding light to the co-development (Carbonell, Rodriguez-Escudero, & Pujari, 2009). Therefore, this study focuses on revealing the key contributions and success factors of supplier-customer co-development.

Customer involvement in the supplier's innovation process refers to the actions that customer takes when the supplier is developing new product or service (Matthing, Sandén, & Edvardsson, 2004). The involvement can be measured through the breadth and depth of the involvement of which breadth refers to the number of activities that the customer takes part and the depth refers to the depth of the interaction during the innovation process (Fang, Palmatier, & Evans, 2008).

Customer involvement has multiple benefits. For example Von Hippel (1986) suggested that companies should collaborate with lead users, who face needs before others in the market place and benefit from finding a solution to their needs. Customer involvement can improve the effectiveness of new product development process by reducing the innovation's time to market (Fang et al., 2008). Also, customer involvement can affect positively to the technical quality of the developed product or service (Carbonell et al., 2009). However, the connection between customer participation and performance of the innovation still remains unclear and the phenomenon requires research which obtains longitudinal data of multiple innovation processes (Fang et al., 2008).

The aim of the study is to reveal the key contributions made in terms of customer involvement in B2B markets and summarize the findings in a model of successful customer involvement in B2B markets. More specifically, the study aims to answer the following research questions: 1) *What kinds of contributions the current literature on customer involvement in B2B markets has made?* And 2) *What are the critical aspects for successful customer involvement in B2B markets?*

Supplier-customer co-development has been studied in new product development, new service development and marketing literatures. The studies have focused on the effects of customer involvement (e.g. Carbonell et al., 2009; Fang et al., 2008), the selection of customers in co-development (e.g. Franke, Von Hippel, & Schreier, 2006; Bonner & Walker, 2004) and customers' roles in the co-development (e.g. Coviello & Joseph, 2012; Öberg, 2010; Blazevic & Lievens, 2008; Fang, 2008). While the literature on customer involvement is scattered in many different research streams, a systematic literature view will help to synthesize the findings.

The remainder of this paper is organized as follows. First, the methodology of the study is explained and the data collection and analyzes processes are depicted. Second, the analyzed articles are introduced and their findings are summarized. Third, the developed model of successful customer involvement in presented. Finally, the study ends with conclusions and discussion.

SYSTEMATIC LITERATURE REVIEW

The purpose of the study was to synthesize findings related to customer involvement in B2B and reveal the success factors of customer involvement in supplier's development process. A systematic literature review was selected for the study as it is a scientifically rigorous method for identifying contributions in the extant literature and provides a systematic way for selecting the articles for the analysis (Thorpe, et al., 2005; Tranfield, Denyer, & Smart, 2003).

The article selection was based on systematic database search with keywords in four databases: ABI/INFORM Global (Proquest), EBSCO, Elsevier (Science Direct) and Emerald as they include the main journals in the fields of innovations, marketing and management.

Several different concepts have been used of collaborative innovation activities between a supplier and customer. The concepts include for example customer involvement (e.g. Nicolajsen & Scupola, 2011), user involvement (e.g. Alam, 2002), customer participation (e.g. Fang, 2008), lead user method (e.g. Franke et al., 2006; Von Hippel, 1986), user innovation (e.g. Raasch, Herstatt, & Lock, 2008), customer orientation (e.g. Alam & Perry, 2002), customer interaction (e.g. Alam, 2006) and collaborative innovation (e.g. Greer & Lei, 2012). This study uses three different keywords: "customer involvement", "customer participation" and "lead user" which are in line with other reviews on customer participation in the creation of offerings (Mustak et al., 2013).

The search was conducted in March 2014, and it includes all that far published articles and articles that appeared in press in the databases. The search was limited to abstract, or abstract, title and keywords (Elsevier). Only academic, peer reviewed articles that were written in English and had a full text access were included in the search. The used search terms resulted in a total of 313 hits after the removal of duplicates.

At this point, the abstracts of all articles were scanned for relevance. Only articles that were related to customer involvement in supplier-customer co-development were selected for the study. Studies that did not fulfil the inclusion criteria or were not relevant and for example focused on co-production or B2C markets were excluded (See Table 1). This resulted in as 82 potential articles published in 43 different journals. To guarantee the quality of the analyzed articles, 14 articles published in journals that did not have an ISI Impact Factor were excluded and thus, 68 articles were included in the full text analysis.

Table 1. Inclusion/Exclusion criteria

Include	Exclude
Customer involvement in innovation	Customer involvement in co-production
B2B markets	B2C markets
Article focuses on customer involvement	Customer involvement not in the focus
Impact factor publications	Journal lacks ISI impact factor

After reading the potential 68 articles further 36 articles were excluded as they were not relevant regarding our topic and we ended up having 32 articles for the review. For example articles that had experiments focusing on consumers were excluded as it is not clear whether the findings would be suitable also for B2B markets. Also articles in which customer involvement was not the focus of the article were excluded. The search strategy is depicted in Appendix 1.

The articles were read in chronological order to reveal the development of the literature stream. The content of each article was analyzed and the articles were grouped according to the topics that they focused on. After that the focus was laid on the contributions that each article has on the success of supplier-customer co-development. These contributions were used for the development of the model of successful customer involvement in co-development. Next, an overview of the review articles and their contributions is given followed by the model of successful customer involvement.

CUSTOMER INVOLVEMENT 1986-2014: OVERVIEW AND KEY CONTRIBUTIONS

A summary of the analyzed articles is presented in Attachment 2. Before analyzing the key contributions, an overview of the articles is presented.

OVERVIEW OF THE REVIEW ARTICLES

The analyzed articles are published between years 1986 and 2014 (See Figure 1). However, no articles were published between 1987-1996, 1997-1999 and 2005-2006.

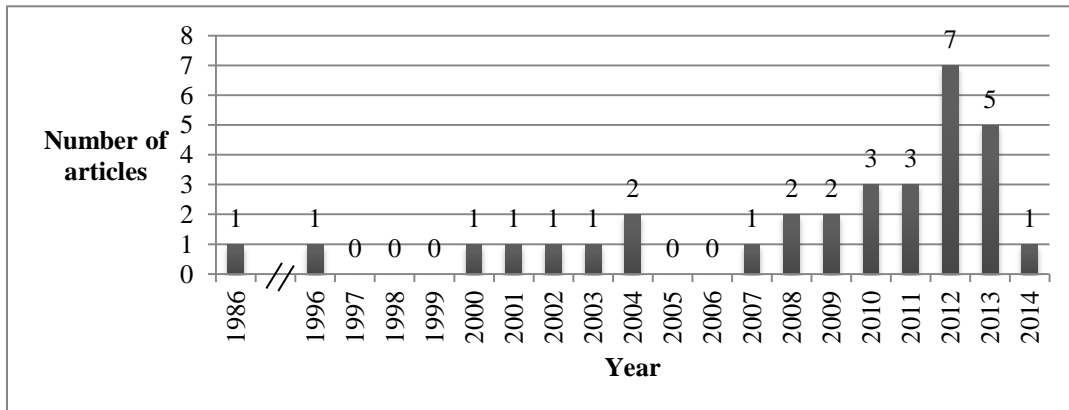


Figure 1. Reviewed articles per year.

More than half of the articles were published during the last four years. This shows that the research on customer involvement in co-development in B2B markets is increasing.

The reviewed 32 articles were published in 21 different journals which focus on management, marketing, production, projects, services and innovation (See Attachment 4). This describes well the vast number of research fields that customer involvement concerns. The spread of the topic is also proven by the vast number of authors who have contributed on the reviewed articles. Altogether 67 different authors have contributed to the reviewed articles and most of those have authored only one article. Only seven authors have contributed to more than one article and only three authors have authored more than two articles.

Most of the reviewed articles used quantitative research methods. Altogether 19 articles relied to survey as a data collection method and the samples varied between 102 to 698 answers. Six articles were conceptual or literature reviews of which some included illustrative examples. Only five articles used qualitative study methods, such as multiple case studies. In these articles the main data collection method was interviews. The remainder two studies used mixed methods.

Almost in all the articles the data on customer involvement was collected from the supplier's perspective. Only one article (Fang, 2008) used a dyadic perspective, in which data was collected both from the supplier's and customer's perspective. Furthermore, only one study states that it has a longitudinal approach (Olson & Bakke, 2001).

The data collection of the reviewed articles has covered several industries and both small and mid-sized as large companies. When comparing all the reviewed articles, the data collection is slightly biased towards manufacturing companies, which is understandable as the focus of this review was companies operating in B2B markets. However, several studies focus also on service firms and for example in financial services (Chien & Chen, 2010).

Most of the reviewed articles focused solely on B2B markets but also studies focusing both B2B and B2C markets were included. There were also studies that did not specify the context but the results were that kind that they would well suit for B2B companies, and those were included in the review.

A little more than half of the articles, namely 17, focused on new product development (NPD) or product innovation, eight focused on services and new service development (NSD), one on process and one on projects, one on products and services, one on products, services and processes and three did not specified the focus. The key contributions of the reviewed articles are discussed next.

KEY CONTRIBUTIONS IN DIFFERENT PHASES

Literature on customer involvement in supplier-customer co-development in B2B markets can be divided in four different phases which are separated by the topic of the studies and their

perspective. These phases also describe certain patterns in the evolution of the customer involvement literature. The phases and key contributions made in each phase are introduced in the following.

Emergence phase (1986-2002): Lead users and customers behind successful development

The emergence phase contains five articles published during the sixteen years from 1986 to 2002. As can be seen, the amount of articles per year is extremely low taking into account the long time span. This tells that the field was only emerging.

These first studies on customer involvement in B2B markets are closely related to the positive effects of customer involvement. The first article by Von Hippel (1986) focused on introducing the lead user method and its benefits and it started the discussion on involving lead users in development processes. The article states that lead user method is suitable to be used both in B2B and B2C markets (Von Hippel, 1986). Maybe due to the high impact of this article, the emergence phase witnessed also three other studies focusing on lead users in the development of new products. These articles focus on describing the lead user method and its phases (Von Hippel, 1986; Olson & Bakke, 2001; Lilien et al., 2002) and proving the effectiveness of the lead user method in developing successful products (Gruner & Homburg., 2000; Olson & Bakke, 2001; Lilien et al., 2002).

Only one article published during this time span did not focus on lead users. This article by Athaide, Meyers, and Wilemon (1996) focused on interactions between the customer during the commercialization of high technology. However, also the Athaide et al. (1996) article focuses on the positive effects of customer involvement and it argues that customer involvement is needed to commercialize high technology process innovations.

Formation phase (2003-2007): New perspectives on customer involvement

Four articles were published during the formation phase from 2003 to 2007. While the amount of publications remained low and actually there were no articles published years 2005-2006, the authors presented new perspectives. For example, Harhoff, Henkel, and Von Hippel (2003) was the first article that had the customer's perspective as they suggested that in some cases it is actually beneficial for the customer to reveal its information about new innovation as the supplier may be able to create the innovation with lower costs.

While the studies published during the emerging phase focused on the benefits of involving customers, the authors during formation phase were seeing customer involvement as a multifaceted phenomenon that is affected by many factors. For example, Lin and Germain (2004) increase understanding on the factors that affect customer involvement. Their study reveals that product complexity and formalization are associated with customer involvement while decentralization decreases customer involvement (Lin & Germain, 2004).

Lüthje and Herstatt (2004) continue the discussion on lead user method by illustrating four lead user method stages (start of the process, identification of needs and trends, identification of lead

users and concept design), which help companies to use the method. Also Lettl (2007) extends the lead user discussion which focuses on the type of customers to involve as his study sheds light on the characteristics of users who manufacturers should involve in their radical product innovation processes.

Growth phase (2008-2010): Effects of customer involvement

Altogether seven new articles were published during the growth phase which took place 2008-2010. That means that during the three-year period 2,3 articles were published yearly. Not only was there increase in the number of articles, but some of the articles were also published in high-quality journals such as Journal of Marketing, Journal of the Academy of Marketing Science and Journal of Product Innovation Management, so the articles had also impact on the field.

All the studies published during this time span are focusing on the effects of customer involvement. However, as the articles during the emergence and formation phased focused on the positive effects, now also negative effects of customer involvement are introduced. For example, Fang (2008) finds that customer involvement decreases the innovativeness of the new product when customers are acting as a source of information and they are well connected to their network. Fang (2008) also argues that customer involvement delays speed to market when customers are acting co-developers and suppliers are dependent on their input.

Even though the negative effects, or so called “dark side” of customer involvement, was introduced during this growth phase, the majority of articles still focus on the positive effects of customer participation. The positive effects can be seen either in the outcome or in the efficiency of the development process. From the outcome perspective, customer involvement is seen to improve the quality of new products (Feng, Sun & Zhang, 2010) and the technical quality of services (Carbonell et al., 2009). In some cases, customer involvement also improves the innovativeness of new products (Fang, 2008). Customer involvement is for example proven to improve the effectiveness of new product development process (Fang et al., 2008; Chien & Chen, 2010) and increase the innovation speed of new products and services (Lin, Chen, & Chiu 2010; Johnson & Filippini, 2009; Carbonell et al., 2009).

Expansion phase (2011-2012): Modes of customer involvement and its effects

The two year period of 2011 and 2012 continued the growth in the amount of publications as ten new articles on the topic were published. This means that on average five new articles emerged per year. Several authors continued the discussion on the effects of customer involvement which had been the focus also during the growth phase. However, also new themes arose, such as the modes of customer involvement.

Altogether five of the articles published during this time span are related on the effects of customer involvement. First, da Silveira (2011) argued that customer involvement improves the quality and delivery of the product which was followed by a study that showed that customer involvement affects positively the product performance (Lau, 2011). Also Feng et al., (2012) revealed positive effects of customer involvement as their results suggest that customer

involvement shortens the new product development process. Basically, all these three articles confirmed and supported the findings presented previously. However, Carbonell et al., (2012) showed in their study, that customer involvement can also have a negative effect on market performance of the developed services when the involved customers are lead users. Nevertheless, lead user involvement affects positively on service newness (Carbonell et al., 2012). Thus, Carbonell et al. (2012) provide support for Fang's (2008) suggestion that customer involvement may have both positive and negative effects. Also Peled and Dvir (2012) point out the "double edged sword" of customer involvement as they emphasize that the benefits of customer involvement are dependent on the project type.

At this point, the articles were also providing more practice-oriented views of customer involvement and articles discussed on how the collaboration actually happens. Nicolajsen and Scupola (2011) argue that customers can take different roles in co-development and they show that two customers can have different roles in the same co-development process. The study by Coviello and Joseph (2012) takes the discussion on customer's roles a step further and introduces ten customer roles on the basis of activities that customer performs. The customer's role is seen to be dependent on the phase of the development process (Coviello & Joseph, 2012). Also Cheng, Chen, and Tsou (2012) study customer involvement from the perspective of co-development phases. They find that in some innovation types, customer involvement is related to design stage as in some others in the launch stage (Cheng et al., 2012).

Also the modes through which the actual customer involvement happens are studied and Edvardsson et al., (2012) develop a framework that consists of four customer involvement modes. They also review different methods for collecting information from the customers (Edvardsson et al., 2012).

At this stage of the evolution of the literature on customer involvement, also completely new topics arise, which are not that easily connected to the previously studied issues. An example of those is an article that introduces a strategic value assessment method that companies should use to evaluate the benefits of collaborating with customers before committing in co-development processes (Nijssen et al., 2012).

Current phase (2013-2014): Looking to the future

The last years have witnessed the publication of six articles on customer involvement. On average this means three articles per year. However, as the review is missing articles published March-December 2014, it is likely that the amount of articles will grow during the year 2014. That suggests that the amount of articles might be stabilizing to an average of five articles which has been the trend during the last three years.

The field already provides some hints that it is reaching a more mature position. For example the publication of the systematic literature review on customer involvement shows that there are already quite a few articles on the topic (Mustak, et al., 2013). Unlike this review, the review by Mustak et al. (2013) focuses on customer involvement generally and not at B2B markets specifically. Another hint of the more mature position of the field is the emergence of new perspectives for customer involvement. An example of those is a study that introduces a

negotiation mechanism that helps companies to clarify contradictions in co-development (Altun, Dereli, & Baykasoğlu, 2013).

Also during this phase, several authors continue the discussion on the effects of customer involvement. Ngo & O’Cass (2013) conclude that customer involvement enhances service quality, a finding which has been introduced also in several earlier studies. Also Feng & Wang (2012) support the earlier studies by confirming that customer involvement affects new product development costs and speed. However, they clarify the impact on product performance as they reveal that the positive effect on product performance happens via development costs and speed (Feng & Wang, 2012). Lin and Huang (2013) focus on the inter-organizational relationships in customer involvement and they show that the relationships have a positive effect on co-development process efficiency but a negative effect on product innovativeness. Finally, the newest article shows that customer involvement helps to develop services with higher market potential but it also takes into account the environmental aspect of the co-development and finds that in turbulent environment the customer involvement has a lower value (Carbonell et al., 2014).

MODEL OF SUCCESSFUL SUPPLIER-CUSTOMER CO-INNOVATION

The reviewed articles pointed out several factors that are important in the success of customer involvement. The factors are related to *customer selection*, *management of co-development* and the *supplier’s internal capabilities* (See Figure 2). If these factors are evaluated by the amount of articles that pointed them out, customer selection seems to be the most important factor in the success of customer involvement. Next, the factors are discussed in more detail.

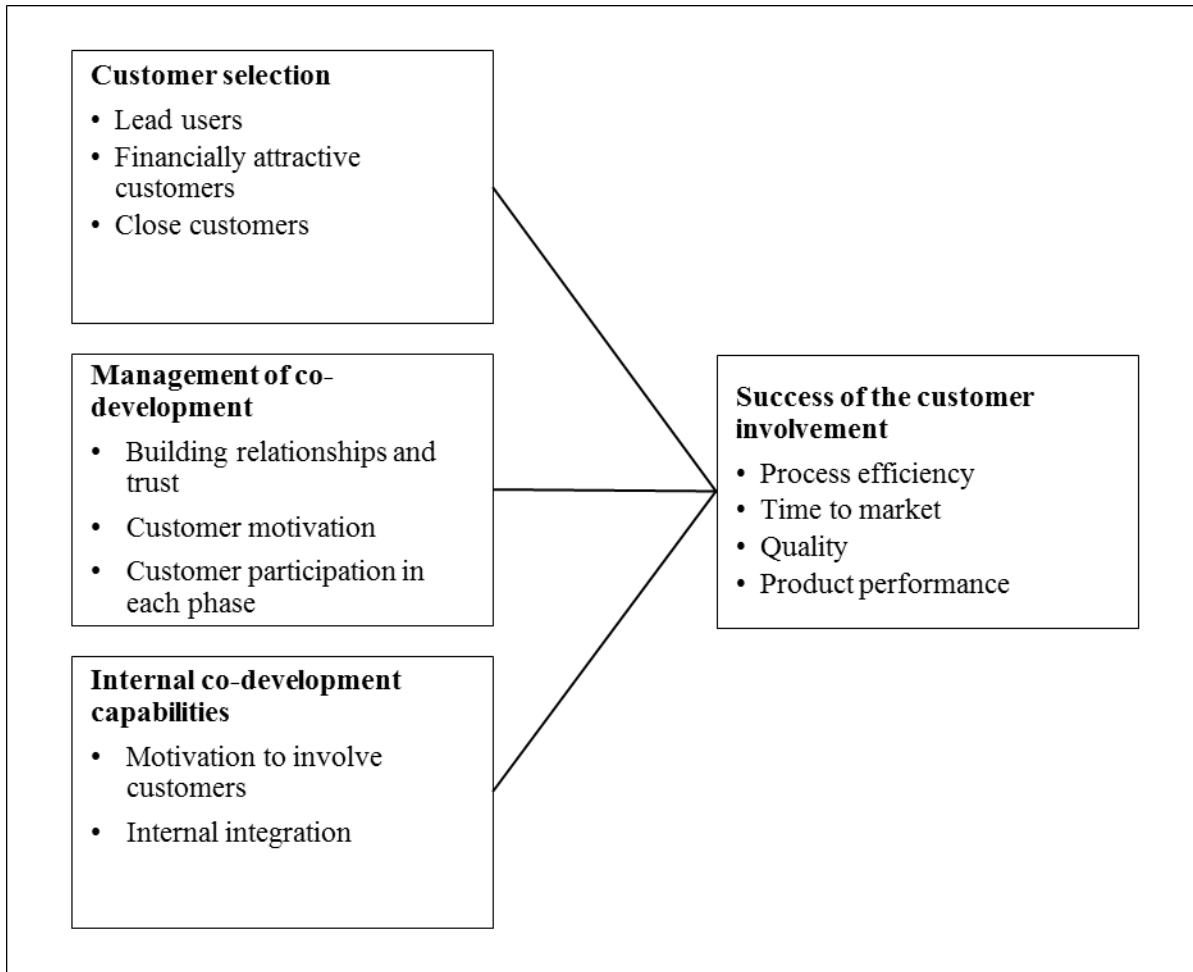


Figure 2. Factors influencing the success of customer involvement.

CUSTOMER SELECTION

Customer selection refers to the type of customer that is involved in the co-development process. Most of the reviewed articles that are discussing customer selection suggest that it is beneficial to involve lead users (Von Hippel, 1986; Olson & Bakke, 2001). Lead users are seen to provide good ideas and their involvement is seen to affect positively to the newness (Olson & Bakke, 2001; Carbonell et al., 2012). However, lead user involvement is expensive and their involvement may have negative effects on market performance (Lilien et al., 2002; Carbonell et al., 2012). Also, other literature on lead users have identified that it is often difficult to identify lead users and the trends that will become common in the marketplace (Urban & Von Hippel, 1988).

Besides lead users, also other customer types may be beneficial for the development. For example Gruner and Homburg (2000) found that involving financially attractive and close customers improves the new product's success.

Finally, also the customer characteristics and individual level features play a role. Suppliers should involve customers or customer representatives who have diverse knowledge from different fields and who are open for new technology (Lettl, 2007).

MANAGEMENT OF CO-DEVELOPMENT

After the supplier has selected a suitable customer partner to the co-development, the supplier must manage the co-development process. Management of co-development includes building relationship with the customer, motivating the customer to be involved, and managing the involvement in different phases of the co-development process.

The supplier must build good relationships with the customer. A study shows that long term partnership is beneficial for the success (Lin et al., 2010) and organizational relationships improve the efficiency of the co-development process (Lin & Huang, 2013). It is understandable that a knowledge flow between the supplier and customer is needed for successful customer involvement. Nowadays, the supplier and customer may not need to be located near each other to achieve knowledge flow, because information technology enables knowledge transfer, but virtual proximity enables customer involvement (da Silveira, 2011).

It is also important to motivate the customer to be involved in the process. Study shows that the employee who is managing the co-development process at the supplier's side has a leading role in involving the customer as customer's trust to this employee enables customer involvement (Nicolajsen & Scupola, 2011).

During the co-development process, the supplier needs to manage customer involvement in each phase. This is important, as involvement in certain stages may affect to the outcome of the customer involvement. Involvement in the early and late stages of the process is critical for the product success (Gruner & Homburg, 2000). However, the innovation type moderates the impact of the stage of involvement. For example, in the development of flexible services, customer involvement is especially important in the design stage (Cheng et al., 2012).

SUPPLIER'S INTERNAL CO-DEVELOPMENT CAPABILITIES

Supplier's internal co-development capabilities related to the supplier's factors that enhance customer involvement. These factors include motivation to involve customers and the supplier's internal integration.

The extant research shows that even though managers have tested customer involvement and they have seen the benefits of involving customers, they might not continue customer involvement in their future development projects (Olson & Bakke, 2001). Thus, the successful customer involvement requires employee motivation to encourage them to involve customers in the development processes.

Internal integration refers to the integration of different organizational functions, such as marketing, R&D and manufacturing. According to a literature, companies who have high

internal integration are more likely to involve their customers in the co-development processes (Feng & Wang, 2013). Thus, internal integration is beneficial for customer involvement.

SUCCESS OF THE CUSTOMER INVOLVEMENT

In the extant literature, successful customer involvement is seen through the benefits that customer involvement provides. The extant literature has identified benefits that are either related to the outcome of the process, which is products, service or process or other benefits that are related to the process itself.

The benefit that is most often named in the reviewed literature is the quality of the developed product or service. Customer involvement is seen to affect positively to the quality (Carbonell et al. 2009, Feng et al., 2010; da Silveira, 2011; Ngo & O’Cass, 2013). Customer involvement is also seen to improve product or service innovativeness and newness (Carbonell et al., 2012; Fang, 2008; Carbonell et al., 2013). However, Fang (2008) found also a negative impact on product innovativeness when the customer is acting as an information resource and it is well connected to the downstream. Thus, it must be emphasized that several contextual factors, such as customer’s role, project type, and environmental turbulence influence the benefits that customer involvement provides (Fang, 2008; Peled & Dvir, 2012; Carbonell et al., 2013). Finally, customer involvement is also seen to improve product performance (Lau, 2011).

Customer involvement has also benefits to the co-development process. Reviewed articles argue that customer involvement increases the overall process efficiency (Carbonell et al., 2009; Chien & Chen, 2010; Feng & Wang, 2013). More specifically, customer involvement decreases time to market by improving the development speed (Fang, et al., 2008; Johnson & Filippini, 2009; Lin et al, 2010; Feng et al., 2012). However, again it must be noted that these benefits are also affected by several contextual factors.

CONCLUSIONS AND DISCUSSION

The purpose of this research was to gather the findings of customer involvement in co-development in B2B markets as the literature is scattered in multiple research streams. This research identified the key contributions and the success factors of customer involvement in the extant literature through a systematic literature review.

This study contributes to the literature on customer involvement in the supplier’s new product, service, process or project development processes. The findings extend the previous literature reviews on customer involvement (Greer & Lei, 2012; Mustak et al., 2013) by focusing on customer involvement in B2B markets. The findings of the literature review show that the contributions in the extant literature focus on the supplier’s perspective on customer involvement. Most studies contribute to the outcomes of customer involvement, for example the customer involvement’s effects to the new product or service performance or the development process efficiency.

A majority of the studies are presenting customer involvement as beneficial and only few studies focus on the negative effects of customer involvement, such as a delay in the speed to market. Also many of the studies fail to provide significantly new results but are supporting the findings made in the literature. In recent years, the emphasis has shifted to the contingent factors that shape the effect of customer involvement into product or service performance or the development process efficiency.

Furthermore, the study gathers the factors that are important in successful customer involvement in B2B markets. The findings revealed three key factors of successful customer involvement. Firstly, suppliers who are aiming to involve their customers in development processes need to *select carefully the customer partners*. Studies show that involvement of lead users, financially attractive and close customers is beneficial. Secondly, the supplier must *manage the co-development process*. This means that the supplier needs to build good relationship with the selected customer(s) and motivate the customer to be involved in all the development stages. Thirdly and finally, the supplier must *develop its internal co-development capabilities*. This means that the supplier should motivate its employees to involve customers and increase the internal integration between different organizational functions.

MANAGERIAL IMPLICATIONS

For managers, the study offers several contributions on how to successfully involve customers into co-development. Firstly, the study emphasizes the customer selection and suggests that companies should collaborate with lead users, financially attractive and close customers. Secondly, the study points out the importance of managing the co-development. The managers should put effort in building trustful relationships with customers and keep the customer motivated through all the process phases. Thirdly, the study suggests ways how companies can internally improve their collaboration capabilities. Companies should motivate their employees to involve customers in development processes. Companies could for example provide bonuses for employees who collaborate with customers. Furthermore increasing internal integration between different organizational departments, such as marketing and R&D is seen to increase customer involvement. Finally, the study suggests ways to measure the success of collaboration. According the review, the success of customer involvement has effects to the process efficiency, time to market, quality of product and product performance. This provides managers more understanding on which measures they should focus on when they are evaluating the success of customer involvement. However, even though the reviewed literature did not reveal any relationship factors, the managers are encouraged to evaluate the success of co-development also from the point of view of the customer relationship.

LIMITATIONS AND FUTURE RESEARCH AVENUES

As any research, only this has its limitations which in this case concern the research method. As the searched articles were searched from databases by using keywords, it might be that some articles using different terminology might have been ignored in the search. However, the used

search concepts were in line with an earlier review on customer involvement (Mustak et al., 2013) and thus we believe that the relevant pieces of literature were found.

The literature review also reviews several gaps on the literature on customer involvement in B2B markets which offer fruitful further research avenues.. Firstly, it is surprising how little there are studies in B2B context focusing on lead users. According to Von Hippel (1986) lead user method is applicable for B2B and B2C markets but the majority of lead user research has been conducted in consumer markets and lead users in business markets are understudied. As the lead user criteria suits well also B2B companies, more studies on lead users in that environment are called for.

Secondly, most of the data is collected from the supplier's side, even though several authors have called for a dyadic perspective (e.g. Coviello & Joseph, 2012). This bias is also reflected to the topics on which the studies focus. While the benefits of customer involvement for the supplier are vastly documented, the customer's perspective is understudied. Further studies should be conducted on the benefits that customers receive from their involvement. This would also help to shed light on the factors that motivate customer's involvement.

Thirdly, the extant literature focuses mostly on the positive aspects of customer involvement. The challenges of the involvement or the negative effects of customer involvement are studied only in few studies. For example Fang (2008) points out the trade of between customer involvement and speed to market and Lau (2011) focuses on the contextual factors that affect the success of customer involvement. This shows that customer involvement has also negative effects that the future studies should focus on.

Finally, the data collection is lacking longitudinal approaches. As Olson and Bakke (2001) point out, the results can change significantly when the phenomenon is studied over a longer period of time, the longitudinal research could open up completely new research avenues. Longitudinal and real time process studies would also better capture the small nuances of customer involvement than the static retrospective research settings.

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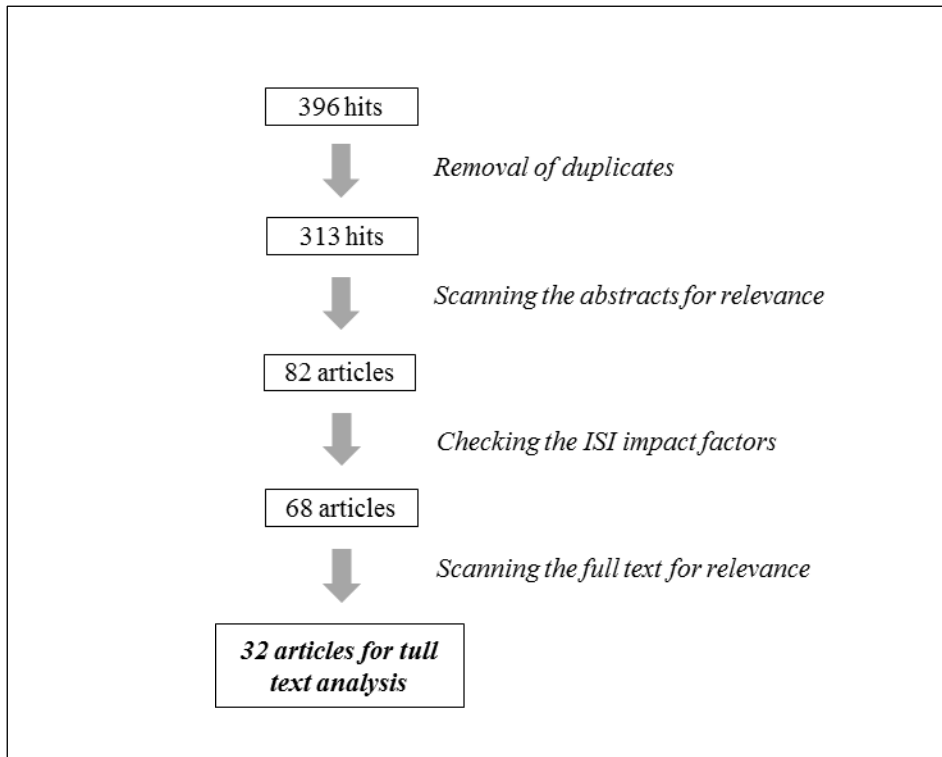
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APPENDICES

Appendix 1. The article search process.



Appendix 2. Summary of the reviewed articles.

Author(s)	Year	Method	Context	Focus	Key results and contribution
von Hippel	1986	Conceptual.	B2B/ B2C	Product, service and process innovation	Suggests that firms should innovate with lead users who are customers who experience needs that will become general in the marketplace later and who benefit from finding a solution for their needs.
Athaide, Meyers, Wilemon	1996	Survey with 242 high technology firms.	B2B	Process innovation	The study suggests that successful commercialization of high technology process innovations requires relationship marketing activities in all the phases of the commercialization.
Gruner, Homburg	2000	Field study of 12 interviews and a survey to 310 German machinery firms.	B2B	Product innovation	The study finds that customer involvement in the early and late stages of the development process can increase the new product success. Also the study concludes that involving lead users, financially attractive customers and close customers is beneficial.
Olson, Bakke	2001	Longitudinal case study in IT firm including 12 interviews, focus groups, discussions and a follow up study.	B2B	Product innovation	The study finds that lead user method provides good product ideas but despite the positive results on using lead user method, the company did not continue to use the method after the study.
Lilien, Morrison, Searls, Sonnack, Von Hippel	2002	Interviews, observations, and a survey.	Not specified	Product innovation	The study finds that lead user method provides ideas that have a better commercial potential but it is expensive, intellectual property may be difficult to be protected and the projects may also fail.
Harhoff, Henkel, von Hippel	2003	Theoretical with real life examples.	Not specified	Not specified	The study suggests that in some cases it is beneficial for customers to reveal their innovations freely.
Lin, Germain	2004	225 surveys from US firms and 259 surveys from Chinese firms.	B2B	NPD	The results show that the greater the product complexity, the greater is the customer involvement in product development. Also, the results reveal that formalization positively predicts customer involvement in product development. Furthermore, the results reveal that decentralization has a negative association with customer involvement in product development.
Lüthje, Herstatt	2004	Theoretical with two illustrative cases.	Not specified	NPD	The study illustrates the five lead user method stages (start of the process, identification of needs and trends, identification of lead users and concept design) with two cases.
Lettl	2007	Multiple case study of five radical innovation including 45 interviews.	B2B/ B2C	Product innovation	The findings reveal that manufacturers benefit from involving certain users in their radical innovation processes. These users e.g. have high motivation towards finding a solution to their problem, are open to new technologies and have a diverse competence in different fields.
Fang	2008	Survey to 143 customer and manufacturer dyads.	B2B	NPD	The study reveals that customer participation either as a source of information or co-developer may have negative effects on product innovativeness or speed to market.

Author(s)	Year	Method	Context	Focus	Key results and contribution
Fang, Palmatier, Evans	2008	Survey of 188 original equipment manufacturers.	B2B	NPD	The study shows that customer participation improves the effectiveness of the new product development process and increases both the supplier's and the customer's relationship-specific investments in the process.
Carbonell, Rodríguez-Escudero, Pujari	2009	Survey to 102 Spanish service companies.	B2B/ B2C	NSD	The study reveals that customer involvement does not directly affect to the market performance of the developed product but improves the technical quality and increases the innovation speed of new services.
Johnson, Filippini	2009	Survey to 250 small- and midsized machinery manufacturing and electrical equipment firms in Italy, Germany, Japan and US.	B2B	NPD	The study finds that customer involvement in innovation improves the new products time to market. Also, customer involvement affects the firm's innovation capabilities which in turn improve new product performance and time to market.
Lin, Chen, Chiu	2010	Survey to 107 Taiwanese computer manufacturers.	B2B	Product and service innovation	The study shows that customer involvement has a positive effect on product, service and market innovation as customer involvement improves the supplier's possibilities to create new products and speeds up the release of new products. Long -term partnership also has a positive effect on product innovation.
Chien, Chen	2010	Survey to 125 financial service firms in Taiwan.	Not specified	NSD	The study shows that customer involvement has a positive effect on the NPD process and cross-functional integration.
Feng,Sun, Zhang	2010	Survey to 139 Chinese companies operating in several industries.	Not specified	NPD	The study shows that customer involvement in new product development improves product quality.
Nicolajsen; Scupola	2011	Case study with 18 interviews in Danish engineering consultancy company.	B2B	Radical NSD	The study reveals that customers take different roles in co-development processes and two customers can have different roles in the same co-development process. The customer's unsolved problems and trust were identified to be factors that lead to customer involvement.
da Silveira	2011	Survey with 698 answers of manufacturers of metal products, instruments and equipment in 22 countries.	B2B	NPD	The results show that virtual and affinity proximity predicts customer involvement in product development and customer involvement improves the quality and delivery of the product.
Lau	2011	Survey to 251 manufacturers from multiple industries in Hong Kong.	B2B	NPD	The study shows that supplier and customer involvement affects positively to the product performance. The study suggests that a company should involve both customers and suppliers as suppliers can point out supply-side knowledge and customers demand-side knowledge.

Author(s)	Year	Method	Context	Focus	Key results and contribution
Coviello, Joseph	2012	Field study of 6 small and young New Zealand based technology firms.	B2B	Major product innovation	The study identifies 10 customer roles (source of latent needs, requester, development buyer, early buyer, technical advisor, co-developer, approver, promoter, sounding board and critic) based on the NPD activities. Also the study reveals a view of NPD that includes five overlapping activities (opportunity recognition, customer-based funding, development and testing, commercialization and feedback).
Edvardsson, Kristensson, Magnusson, Sundström	2012	Critical review.	Not specified	NSD	The article develops a framework of four different modes in which customers can provide information depending on whether the customer is insitu or exsitu and in the service context or out of the service context. The study also reviews different methods for collecting customer information in these four modes.
Feng, Sun, Zhu, Sohal	2012	Survey to 176 manufacturing companies in China.	B2B	NPD	The study shows that customer focus, customer involvement and customer communication shorten the new product development process.
Cheng, Chen, Tsou	2012	Survey to 179 service companies in Taiwan.	Not specified	NSD	The results show that customer involvement varies between different types of market-creating service innovation. In some innovation types customer involvement is related to design stage and in others in the launch stage.
Carbonell, Rodriguez-Escudero, Pujari	2012	Survey to 102 Spanish service firms.	Not specified	NSD	The study shows that lead user involvement in NSD has a positive effect on service newness and service advantage but lead users can also have a negative direct effect on market performance. Involving close customers on the other hand has a positive effect on service advantage but their involvement increases speed to market.
Nijssen, Hillebrand, Jong, Kemp	2012	Survey to 136 small and mid-sized high tech firms in the Netherlands.	B2B	Not specified	The article suggest that companies should use a strategic value assessment (SVA) before starting collaboration with customers as it helps to benefit from customer involvement. Companies using SVA has a higher likelihood of collaborating with lead customers.
Peled, Dvir	2012	A multiple case study in Israeli defense industry.	Not specified	Projects	The article introduces two customer involvement styles (design with and design by) of which the design with style is recommended in the article and reveals that the benefits of customer involvement are dependent on the project type.
Mustak, Jaakkola, Halinen	2013	A systematic literature review of 163 articles on customer participation.	Not specified	Not specified	The article provides a conceptualization of customer participation in the creation of offerings and reveals that customer involvement brings economic benefits, improves buyer-seller relationships and aids to create offerings that better help customers in value creation.
Altun, Dereli, Baykasoğlu	2013	Conceptual with illustrative example.	Not specified	NPD	The article suggests that companies should use a multi-issue negotiation mechanism named as Modified Even-Swaps which help companies to clarify contradictions and provides a mode where lead users can evaluate design alternatives.

Author(s)	Year	Method	Context	Focus	Key results and contribution
Ngo, O'Cass	2013	Survey to 155 service firms in Australia.	Not specified	NSD	The results show that innovation capabilities affect service quality through customer participation and customer participation enhances service quality.
Feng, Wang	2013	Survey to 214 Chinese manufacturing companies.	Not specified	NPD	The results show that companies who have high level of internal integration are more likely to integrate the customers in their NPD processes. Also the results reveal that customer involvement helps companies to develop new products in shorter time and cost-effectively and customer involvement affects market performance through new product development costs and speed.
Lin, Huang	2013	Survey to 179 high-tech firms operating in the electronic industry in Taiwan.	B2B	NPD	The results reveal that involving customer in NPD as information source or co-developers influence inter-organizational relationships and strong inter-organizational relationships have a positive effect on efficiency of the process but negative effect on product innovativeness.
Carbonell, Rodriguez-Escudero	2014	Survey to 102 Spanish service firms.	Not specified	NSD	The results show that customer involvement can lead to the development of unique services with a higher market potential and highly innovative business services. However, especially in technologically turbulent environments where customer's information has a lower value, it is not always taken into account in decision-making.

Appendix 3. Journals that published the reviewed articles.

No.	Journal	Number of articles
1	European Management Journal	1
2	Expert Systems with Applications	1
3	Industrial Management + Data Systems	3
4	Industrial Marketing Management	2
5	International Journal of Production Research	1
6	International Journal of Project Management	1
7	Journal of Business & Industrial Marketing	1
8	Journal of Business Research	2
9	Journal of Engineering and Technology Management	1
10	Journal of Marketing	2
11	Journal of Product Innovation Management	4
12	Journal of the Academy of Marketing Science	1
13	Management Science	2
14	Managing Service Quality	1
15	R&D Management	1
16	Research Policy	1
17	Research Technology Management	1
18	Service Industries Journal	1
19	Technovation	1
20	The Journal of Business & Industrial Marketing	2
21	The Journal of Services Marketing	2