Customer co-creation in service innovation: a matter of communication?

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CUSTOMER CO-CREATION IN SERVICE INNOVATION – A MATTER OF COMMUNICATION?

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Customer Co-creation in Service Innovation – A Matter of Communication?

Abstract

Purpose – Customer co-creation is becoming increasingly popular among companies, and intensive communication with customers is generally seen as a determinant of the success of a new service or product. This study analyzes customer co-creation based on four dimensions of communication – frequency, direction, modality, and content – in order to understand the value of customer co-creation in service innovation. One of the key aims of the study was to investigate whether all dimensions of customer co-creation have an effect on product and market success, and if the effect depends on the degree of innovativeness of a development project.

Design/methodology/approach – The authors conducted a study including 334 managers with experience in new service and product development to examine how development projects applied customer co-creation in terms of communication in order to address future customer needs. Data was analyzed using PLS (partial least squares). The first analysis was performed with a sub-sample of 207 development projects regarding incremental innovations. A subsequent analysis was performed with a sub-sample of 77 development projects on radical innovations.

Findings – Three of the four dimensions of customer co-creation (frequency, direction, and content) have a positive and equally significant effect on product success when developing incremental innovations. For radical innovations, frequency has a positive effect and content has a negative significant effect on product success. These findings suggest that co-creation and innovation can be combined, but that the choice of methods for co-creation differs depending on whether incremental or radical innovations are developed.

Originality/value –Despite a general consensus that co-creation with customers is beneficial, there is a lack of agreement regarding how and why. The present article addresses this shortcoming and shows that co-creation is largely about communicating with customers in order to understand their future needs. On the other hand, a company working on radical innovations may wish to limit customer input that is too concrete or solution based.

Keywords Customer co-creation, Innovation, Service-Dominant Logic (SDL), Communication, Pro-active market orientation.

Paper type Research paper

Introduction

As early as the 18th century, Adam Smith (1776/2007) identified users as a great source of innovation: "*One of the greatest improvements that has been made upon this machine [was] the discovery of a boy who wanted to save his own labour*" (p. 14–15). Today, there are many examples of companies attempting to collaborate with their customers in what is commonly referred to as co-creation (Lusch, *et al.,* 2007) and viewing them as an important resource when developing new offerings (Prahalad and Ramaswamy, 2004). As Smith noted, an important reason for such attempts is that users have innovative ideas about future offerings (Kristensson *et al.*, 2004). The key question is how companies should design their development processes to communicate with customers in order to gain access to future customer needs and ideas.

Despite the general consensus that co-creation with customers is beneficial, there is a lack of agreement regarding how and why (Kristensson *et al.*, 2008; Witell *et al.,* 2011). When describing the essence of the service-dominant logic, Lusch *et al.* (2007) contended that co-creation with customers for the purpose of innovation is a foundational part of modern marketing, and that co-creation involves "shared inventiveness" (p. 11). Prahalad and Ramaswamy (2004) concluded that "informed, networked, empowered, and active consumers are increasingly co-creating value with the firm" (p. 1). However, the specific actions and behaviors that make up co-creation have not yet been fully addressed (Witell *et al.*, 2011). Gruner and Homburg (2000) and Lundkvist and Yakhlef (2004) argued that the process of communication and socially rich interactions with customers is one of the determinants for product success. Furthermore, Payne *et al.* (2006) reported that communication is an important element in a company's ability to manage value co-creation. The research has this far focused predominantly on when to *listen* to customers (Gruner and Homburg, 2000), rather than how companies should *communicate* with customers. Therefore, the present study focuses on the communication process between a company and its customers and how this process can improve product and market success.

The purpose of the study is to gain a better understanding of customer co-creation in the development process; that is, co-creation for others (Witell *et al.*, 2011). The study applied a four-dimensional communication model that has previously been used to analyze marketing channel communication (Mohr and Nevin, 1990; Bonner, 2010). The four dimensions are frequency, direction, modality, and content. Although previous research has emphasized the importance of communication, both with customers and within companies (Gruner and Homburg, 2000; Gustafsson and Johnson, 1997; Joshi and Sharma, 2004), research that uses communication theories to gain a deeper understanding of customer co-creation has been sparse. The present study also looked at whether all dimensions of the communication model have an effect on product and market success or whether the effect depends on the degree of innovativeness (incremental/radical) of a development project.

Conceptual framework

Service innovation

Gallouj and Weinstein (1997) viewed innovation in services as any change that affects one or more terms of one or more service characteristics. Such changes are brought about based on a number of operations, such as addition, subtraction, association, dissociation, or formatting (Gallouj and Savona, 2011). Based on this view, six modes of innovation can be identified: radical innovation, improvement innovation, incremental innovation, ad hoc innovation, recombinative innovation, and formalization innovation. In a similar vein, Michel et al. (2008) suggested that service innovation can be viewed as a change in the role of the customer and the value creation processes. An innovation is often manifested as a change in the competences of the company, the competences of the customer, the prerequisites of the offering, or what the customer co-creates. Both of these conceptualizations of service innovation are independent of the offering's degree of tangibility, and adopt the role and value-creational processes of the customer as the focus of attention. Consequently, the key to succeeding with service and product development should be identifying

and understanding the value-creational processes. This is the point of departure in this article and is developed further in the next section.

The importance of value-creational processes

Based on a service-dominant logic, a market offering is attractive if it captures the value-in-context for a customer (Vargo *et al.*, 2009). Therefore, the focus is not on the offering per se but on the customers' value creation process, through which value for customers emerges (Grönroos, 2000). Vargo *et al.* (2009) claimed that value is not created until the customer integrates and applies the resources of the service provider with other resources in their own context. Value is always contextually specific and determined by the customer or the beneficiary. Furthermore, Kotler (1977) argued that the importance of the market offering lies not so much in owning the products themselves as obtaining the services they render. Therefore, service is a perspective of value creation and virtually anything can be viewed as a service (Edvardsson *et al.,* 2005). In line with this, the service-dominant logic defines co-production and co-creation as phenomena that are connected to the production and delivery of a service; in other words, how companies deal with their customers through customer participation in the joint creation of service value (Vargo and Lusch, 2004).

Previous research is clear regarding the difficulty of understanding value-creation processes (von Hippel, 1994). Von Hippel (1994) explained that customer value is "sticky information," which means it is costly to transfer from one place to another because it is tacit (Luthje *et al.*, 2005). Therefore, companies find it difficult to identify, understand, and adopt knowledge about the value-creational processes that customers experience. It follows explicitly from the service-dominant logic that value-creation processes are inherently subjective and must be understood in relation to each specific time and place in which they occur (Lusch *et al.,* 2007). Accordingly, companies have started to treat their customers as active collaborators when developing various offerings. This contrasts with the traditional view of customers as passive informants from whom information can be extracted by means of surveys or focus groups. In line with this, Witell *et al.* (2011) showed that new

offerings developed through market research techniques based on customer co-creation are more profitable than those developed with traditional market research techniques. In order to understand this in a conceptual way, Narver *et al.* (2004) made a distinction between responsive and proactive market orientation. A responsive market orientation refers to a business's attempt to understand and satisfy its customers' expressed or spoken needs, whereas a proactive market orientation refers to attempts to discover, understand, and satisfy customers' latent needs. Expressed needs may have either expressed or latent solutions.

Narver *et al.* (2004) suggested that companies that apply a proactive market orientation work more closely with their customers. Proactive market orientation can be achieved by working closely with lead users or by conducting market experiments to discover future needs that are typically difficult to foresee or articulate (Jaworski *et al.* 2000; Slater and Narver, 1998; Atuahene-Gima *et al.*, 2005; Rogers, 1995). Witell *et al.* (2011) suggested that it is necessary to distinguish co-creation for use from co-creation for others: customers perform co-creation for use for their own benefit, while co-creation for others is oriented towards other customers. Therefore, co-creation in the development process mainly concerns co-creation for others. Furthermore, given that it can be difficult to identify or express certain customer needs (Slater and Narver, 1998; Tyre and von Hippel, 1997), the present article assumes that co-creation for others typically depends on opportunities for interaction and communication. Essentially, customer co-creation concerns different ways of communicating and interacting with customers and their context.

Companies often know more about their solution to a certain problem than they do about the customer's needs regarding the same problem. Companies should communicate with customers in the development process in order to understand how the solution can be applied to satisfy the customer's needs (Ogawa, 1998). Cohen and Levinthal (1990) described what they refer to as "absorptive capacity" (the company's capacity to assimilate customer needs) as a major challenge for companies developing new offerings. Morgan and Hunt (1994) found that cooperation with all parts of a network (including customers) is essential in order to create an attractive offering. Based

on a literature review, Gruner and Homburg (2000) concluded that intensive communication with customers is generally considered to be a determinant of product success and that previous studies have provided a "limited insight into the interaction with customers." The present article concludes that because value-creation processes are difficult to understand, it is essential to collaborate with customers during the development process. Companies must also know more about customer interaction; that is, the communication process involved in applying a collaborative process.

Customer co-creation as communication and interaction with customers

In the organizational communication literature, Mohr and Nevin (1990) established specific dimensions that influence the quality or richness of the communication. Bonner (2010) showed that the communication literature offers a novel and valuable opportunity to examine the quality of the communication in development processes, particularly with regard to need-related information that can be difficult to transfer from a customer to a company. Based on the organizational communication literature, Mohr and Nevin (1990) and Bonner (2010) analyzed the frequency, direction, modality, and content of marketing channel communication. The present article uses marketing channel communication as a framework to understand how customer co-creation during the development process results in a deeper understanding of customers' needs. The underlying idea is that intense co-creation leads to higher product success; this is depicted in our conceptual model, shown in Figure 1.

>> insert Figure 1 about here <<

The four dimensions result in an interactive communication climate that is more or less conducive to the learning, sharing, and understanding of customer needs. Frequent, bidirectional, face-to-face, and active communication is likely to enable bilateral trust and high-quality information exchange about customers' needs. Active communication enables customers and companies to meet and exchange information regarding needs that might otherwise be difficult to express or

transfer. In line with this, the present article defines customer co-creation as a frequent, bidirectional, and face-to-face communication process that is used when attempting creative problem solving. Consequently, passive co-creation is considered less beneficial for the outcome of the innovation and less frequent, unidirectional, electronic, and anonymous communication in which there is an uneven distribution of initiative and creativity. Therefore, it less beneficial for a development process.

Development of hypotheses

The hypotheses build on the framework presented in Mohr and Nevin (1990) and, more specifically, on the four dimensions developed in their article and their relationship to product success. The first dimension, frequency, refers to the amount of time that the involved parties used for communication. In the context of customer co-creation, frequency refers to such aspects as the amount of on-going feedback between a company and its customers. It may also concern the number of mutual experiments or the amount of iteration that takes place with customers during the development of a specific version of the offering within a development project (Cooper, 1996; Thomke, 2003). Frequency can also refer to the extent to which a learning process about customers' needs occurs and leads to the generation of new ideas in a development project (Day, 1994; Matthing *et al.*, 2004). Given the framework in Mohr and Nevin (1990), a relationship with a higher frequency of co-creation will probably result in an increased likelihood of product and market success. Accordingly, the first hypothesis is:

H1: Customer co-creation characterized by high frequency will lead to increased product and market success.

The second dimension of the communication process that characterizes co-creation regards direction. Direction refers to the democratic aspect of communication; namely, the extent to which

one party exerts power over the other(s). This could apply to issues such as whether both parties take equal initiative to interact and assume approximately the same workload. With regard to customer co-creation, direction is believed to be important when it is difficult to estimate future customer usability (Hiltz *et al.*, 1986; Mohr and Sohi, 1995). In other words, when it is difficult to foresee or imagine value-creation, there must be an even distribution of communication between parties in order to envision or understand future customer needs (Bonner, 2010). Furthermore, when there is an even distribution of communication and interaction, both parties can be expected to contribute to the end result, which should lead to more novel ideas (von Hippel, 2005).

In sum, the present article assumes that democratic dialogue results in processes that are beneficial for the outcome of development processes. Because companies often take an overly dominating role, the second hypothesis states that more evenly distributed initiatives will lead to more beneficial outcomes of the development process.

H2: Customer co-creation characterized by direction (that is, an evenly distributed two-way communication) will lead to increased product and market success.

The third dimension, modality, refers to how information is transmitted. For example, it could apply to aspects of the communication process, such as whether the dialogue takes place face to face or whether it is possible to provide immediate feedback. It may also apply to the degree to which communication is focused on a specific recipient (Daft and Lengel, 1987). With regard to customer co-creation, modality refers to the extent to which communication takes place face to face or in other ways (such as electronically) and the extent to which a customer is given the opportunity to deal directly with critical aspects in a development project. This article implicitly assumes that electronic communication typically addresses many recipients. Research confirms that group decision making is hampered when it is done through electronic communication as compared to face-to-face communication (Hiltz *et al.*, 1986). Also, when customers are excluded from any part of

a development project, it is most likely to be the critical parts, for which customer input might have the greatest impact. The third hypothesis predicts that collaborative processes, such as face-to-face communication and openness in critical aspects of a project, will facilitate successful development of future services and products.

H3: Customer co-creation characterized by high modality will lead to increased product and market success.

The final dimension that characterizes customer co-creation regards content, or what is transmitted during communication (Mohr and Nevin, 1990). In the context of co-creation between a company and its customers, content can relate to whether the focus is on customer needs and difficulties related to value-creation. On the other hand, customers may sometimes be invited to companies with the purpose of strengthening the relationship rather than improving the outcome of the development processes. This article focuses on whether companies enable customers to share their inventiveness at the locations where their needs are most likely to be present in the future (that is, without trying to determine them in a superficial laboratory, for example). The reason for this is related to the frequently documented difficulty of expressing needs (von Hippel, 1994; Morrison *et al.*, 2000, Ulwick, 2004). It is assumed that latent needs are more easily detected if a search is conducted at the same time as the user experiences them (Kristensson *et al.*, 2004). Hypothesis 4 predicts that new offerings will be more successful if they account for needs that have been identified from use experiences (Magnusson *et al.*, 2010; Edvardsson et al., 2012). In addition, if customer inventiveness is shared at the location where needs are present, then other resources that are typically used in combination with the company's potential solution will increase the likelihood of customer needs being fully understood (Luthje *et al.*, 2005). This, in turn, should lead to product and market success (Lusch *et al.*, 2007). The fourth hypothesis is formulated as follows:

H4: Customer co-creation that focuses on content related to context will lead to increased product and market success.

One issue is whether all dimensions of customer co-creation have an effect on product success in all kinds of development projects, or whether the effect depends on the degree of innovativeness of a development project. Based on the literature on customer co-creation for others, it is difficult to identify any research suggesting that active participation of customers in a development project would have any negative influence on product success. However, the present study has identified four separate dimensions of co-creation, and it is possible that a single dimension could have a negative effect on product success. Gruner and Homburg's (2000) study of the relationship between customer interaction and product success throughout the development process in the German machine industry concluded that customer interaction is related to NPD success in some phases (idea generation, concept development, prototype testing, and market launch), but not in others (project definition and engineering). This line of research suggests that customer interaction could be beneficial for certain activities, but not for others. However, Gruner and Homburg's study does not provide any guidance regarding how the degree of innovativeness would influence the effect of customer co-creation on product success. Therefore, the present study assumes that all the dimensions of customer co-creation should be beneficial for the innovation process.

Method

Sample

The empirical data was collected through a paper-based survey sent to the service or product development managers of certain European companies, selected from an externally purchased database. It was not possible to screen companies in advance to determine which companies had a development organization. Accordingly, managers were asked to participate only if

their organization conducted development projects. If the companies were unable to participate in the survey, perhaps because they did not conduct NSD or because the person included in the sample no longer was with the company, they were asked to notify either the data collection company or the researchers. These companies, which constituted 16.4 percent of the respondents for the total sample, were then removed from the sample. Reminders were sent to non-respondents one and two weeks after the initial mailing. The procedure yielded a response rate of usable responses of 20.0 percent. Following the procedure recommended by Armstrong and Overton (1977), the tests indicated that there were no statistically significant differences between early and late respondents in terms of the survey data.

A total of 334 companies sent usable responses. Complete data was obtained for manufacturing and service companies in industries such as the machine industry, pulp and paper, fabricated metal goods, machinery and equipment, renting and real estate, construction services, consumer services, and business services. All questions in the survey, including those regarding activities and performance, were asked at the project level. The respondents categorized all projects as improvements, incremental innovations, or radical innovations. The main research question in this article concerns customer co-creation in projects described as incremental innovations. The analysis of co-creation for incremental innovation resulted in a main analysis of a sub-sample of 207 development projects. Separate analyses were then performed for the different categories of projects because the four dimensions of customer co-creation were observed to behave differently. Having established a model that behaved consistently for incremental innovations, a simplified analysis was carried out for the 77 projects that were classified as radical innovations.

Measures and Descriptive Statistics

The survey instrument was developed on the basis of previous research and existing research instruments. Twenty items were used to operationalize the six latent constructs that covered customer co-creation, product success, and market success. Each item was scored on a 10-

point scale that ranged from “completely disagree” to “completely agree” (except for a section containing descriptive categorizations of the organization and the development projects).

Theory guided the item selection and generation for the four dimensions of customer co-creation. Appendix 1 describes the scales that were used, as well as the mean values, standard deviations, and loadings for each item. As Appendix 1 also shows, frequency and content were operationalized as four-item constructs, while direction and modality were operationalized as three-item constructs. Business performance was measured by two scales developed by Song and Perry (1997a; 1997b) that captured the product and market success of the innovation. Specifically, market success was measured by a three-item scale that assessed the market share of the offering relative to competitor’s offerings and the firm’s own offering (Song and Perry, 1997a; 1997b). The study’s constructs for product and market success were measured indirectly by asking the management of the participating organizations. Research into companies and business units of large companies commonly uses subjective measures of performance.

Analysis

The strong correlations between many of the communication practices that organizations use can obscure the relationships between practices and performance. Structural equation modeling and, especially, partial least squares (PLS) are well suited to handling such situations (Steenkamp and van Trijp, 1996). Whereas the aim of the competing structural equation modeling approach (covariance structure analysis) is to explain covariance, the objective of PLS is to explain variance in the endogenous variables; this makes it the most suitable method for the purpose of this research. In addition, small sample sizes and different measurement scales were used for subsequent analyses (for the control variables), and PLS is the structural equation approach that best handles these challenges (Bagozzi and Yi, 1994). PLS is an estimation procedure that integrates aspects of principal-components analysis with multiple regression (Wold, 1982). The procedure extracts the first principle component from each subset of measures for the various latent constructs and uses these

principle components within a system of regression models. The algorithm then adjusts the principle-component weights to maximize the predictive power of the model.

All constructs were modeled using reflective indicators; that is, indicators were created based on the assumption that they all reflect the same underlying phenomenon (Chin, 1998). Jackknife estimates were generated in order to evaluate the significance of the paths in the model (Chin, 1998). Jackknifing generally involves deleting every n^{th} case or observation, estimating the model parameters, and then repeating this sample-resample procedure in order to generate a set of standard errors for the model parameters (Efron and Tibshirani, 1993). Simple t-statistics were then computed in order to determine whether the parameters are different from zero. Following Tukey's guidelines, five percent of the sample was removed during the re-sampling procedure, which resulted in 20 sub-samples per model.

>> Insert Table 1 about here <<

The Average Variance Extracted (AVE) method was used to check the validity of the model (Fornell and Larcker, 1981). The AVE measures the amount of variance captured by the constructs in relation to the amount of variance due to measurement error (Fornell and Cha, 1994). To ensure discriminant validity of the constructs, the AVEs of the latent variables should be greater than the square of the correlations among the latent variables (Chin, 1998). In PLS, this comparison is made using the correlation matrix of the latent constructs, where the diagonal elements are replaced by the square root of the computed AVEs. Higher values for the diagonal elements compared to the off-diagonal elements suggest good discriminant validity. As Table 1 shows, this is the case for the model, which ensures that the model shows good discriminant validity.

Two control variables were introduced in the model: the size of the business unit (scale = 1–4, mean value = 3.19, std = 0.69) and the experience of the respondent. Experience was measured by two variables: experience with development projects (mean = 12.14 years, std = 8.23) and the length

of time the respondent has been with the company (mean = 13.46 years, std = 9.24). The results were equal or very similar to those from before the control variables were added. Consequently, it was concluded that the model for incremental innovation had good validity and generalizability.

Results

The proposed model was estimated using PLS across companies. The first step in assessing the measurement models was to test the reliability of each measured variable to ensure that the measurement variables (MVs) applied accurately to their related constructs. Overall, the MV loadings were all relatively large and positive. As the appendix shows, most of the loadings exceeded the recommended threshold value of 0.707 (Hulland, 1999). However, the standard research practice is to keep the item in the analysis if the loading exceeds 0.5, as long as there is a good theoretical reason for doing so. In this case, the fact that the study built on established scales for market success made it appropriate to keep all measures in this scale. Figure 2 presents the results of the analysis. All but one of the paths are significant (using adjusted t-tests and $p< 0.05$). The significant path coefficients were 0.150 for frequency, 0.165 for direction, and 0.205 for content. The non-significant path is modality. Although the model behaved well for incremental innovations, we also wanted to apply a similar model to a data set that covered development projects of radical innovations.

>> insert Figure 2 about here <<

Revisiting the model for radical innovations

As mentioned in the method section, the model in Figure 2 is based on data from projects that developed incremental innovations. In addition, the original data set had 77 responses that covered projects on radical innovation. The exact same model as the one illustrated in Figures 1 and 2 and operationalized as described in the appendix was applied to this data. The result was that three of the latent variables – direction, modality, and content – had mixed signs among the

indicators (-/+), which means that the underlying indicators do not belong to the same latent variable and that it is uncertain what is really being measured. To resolve this, the indicators with the lowest weight in the model and an opposing sign to the others were omitted. This resulted in a model with two indicators for all three of the mentioned latent variables, while frequency was intact. Of course, this indicates that the model does not work particularly well for radical innovations, which is a result in itself. The implication for the dysfunctional model is that the communication process – and therefore co-creation – is different for radical innovations than for incremental innovations.

The model for radical innovations produced two significant paths (using adjusted t-tests), frequency (0.336, $p < 0.05$), and content (-0.246, $p < 0.05$). The results indicate that companies should interact frequently with their customers; this is similar to the findings in the case of incremental innovations. The path coefficient for content is negative, which indicates that customers should not be too highly involved in developing the actual content of radical innovations.

Discussion

This article has looked at customer co-creation as a communication process that is frequent, bidirectional, and face-to-face when attempting creative problem solving (that is, innovation). From such a perspective, communication and interaction are among the most important aspects of co-creation to achieve product and market success. This research applied a model from research on market channel communication in order to understand the impact that different aspects of customer co-creation have on product and market success. The four different dimensions, which originated from research by Mohr and Nevin (1990) and Bonner (2010), were frequency, direction, modality, and content.

The results of the present study contribute to a deeper understanding of why new offerings developed through market research techniques based on co-creation with customers are more profitable than those developed with traditional market research techniques (Witell *et al.*, 2011). For development projects that aim to achieve incremental innovations, three dimensions of customer

co-creation were equally important for product and market success. Good results from co-creation with customers are generally caused by frequency, direction, and content. This means that a company can improve the results of a development project by spending more time communicating with customers. This communication should be democratic; that is, the communication should be between two parties of equal power and should focus on specific types of content during communication. In addition, the study's results support the theory that the way in which information is exchanged between the customer and the company does not explain why co-creation with customers performs better than traditional market research techniques. One explanation of this result is that the ability to interact with customers through social media and discussion panels on the Internet has enabled companies to get to know their customers without face-to-face interaction.

From a managerial perspective, this suggests that it is beneficial when working with incremental innovation to spend time with customers, or in other words, become immersed in the customer's context as much as possible (Gustafsson and Johnson, 2003). Examples of this can be found within the hospitality industry, where understanding of customer choice has been found to significantly facilitate service innovation (Victorino *et al.*, 2005). The finding also suggests that treating customers as more equal partners in the process increases the chances of product and market success. Therefore, companies must open up their organization to a larger extent, which can be quite a challenge (Olson and Bakke, 2001). Companies should create dialogues with customers during the value co-creation process and meet and communicate with customers in the customers' own environment or through various media, such as social media. The findings also corroborate those of previous studies in that information involving customer contexts or the transfer of sticky information is important in the development process. The results point toward the need for increased understanding of the circumstances surrounding the customers' value-creation processes or value-in-context. Employees, whether front-line or elsewhere in the organization, must communicate with customers in order to understand the experiences that create value for them;

otherwise, they will lose their capacity to generate ideas for the next generation of offerings that will serve their customers.

However, the communication process of co-creation for radical innovations seems to behave quite differently in that the four suggested dimensions are not entirely applicable in the same way for radical innovation as they are for incremental innovation. The different dimensions in the communication process behave differently in the two conditions, which suggests that companies must apply different communication strategies in co-creation depending on the degree of innovativeness of a development project. The two dimensions that are significant in radical innovation are frequency (positive) and content (negative). Direction and modality did not have a significant impact on product success. This implies that companies should learn from customers through frequent contact, which is the same as in the case of incremental innovations. However, companies should not be overly concerned with suggestions of the content of a potential new offering. Radical solutions can often be considered unthinkable in advance, which can make radical solutions hard to imagine, but customers know a good idea when they see and use it. Customers create solutions based on their previous experiences of usage of different products or services, which makes it difficult to suggest solutions that are truly radically.

An example of this point is Apple, which is a leader in terms of offering value-creating radical innovations. In a recent article on co-creation, an Apple designer said, “At Apple we don’t waste our time asking users, we build our brand through creating great products we believe people will love” (Skibstedt and Bech Hansen, 2011). The demand for something fundamentally new is completely unpredictable. Even users themselves have no idea whether they will like an entirely new product before they start using it (and perhaps then only after years of use). Still, if radical innovations are to succeed, there must be latent customer needs connected to the new solution. The only way a company can form an opinion about the validity of this match between latent need and solution is to spend time with its customers generating knowledge about the context-specific sticky information, which may require a different tool set for companies (Witell *et al.*, 2011).

Limitations

The respondents in this study came from a wide variety of companies and industries. Some of the companies can be categorized as pure service companies, some as pure goods companies, and some as a combination. It does not matter whether the media of delivering value is goods- or service-based when it comes to communication regarding innovation with customers. Also, there is a trend among goods-based companies to generate more of their business on delivering services to their customers. This is sometimes expressed as the service infusion in manufacturing (Gustafsson, Brax, and Witell, 2010). In a similar vein, service-based companies are trying to become more product-like when delivering value to their customers. This is often accomplished using technology, and it is possible to talk about technology infusion into service (Edvardsson *et al.*, 2000). The implication is that most companies have a mixture of tangible and intangible offerings and type of industry does not discriminate well if the innovation is service- or goods-based. Consequently, this study has adhered to the service-dominant logic (Vargo and Lusch, 2004) and viewed all companies as service companies.

Furthermore, it was not possible to use exactly the same measurement model in both conditions (radical versus incremental innovations), which implies that the communication processes are simply too different. The main focus of this article was to understand the communication process for incremental innovations. Consequently, the model for radical innovation is not as robust as the one for incremental innovations.

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	Frequency	Direction	Modality	Content	Product success	Market success
Frequency	0.80					
Direction	0.39	0.72				
Modality	0.40	0.57	0.83			
Content	0.52	0.45	0.65	0.81		
Product success	0.32	0.31	0.27	0.34	0.88	
Market success	0.34	0.31	0.26	0.38	0.78	0.85

Table 1. Assessment of the validity of the model (AVE).

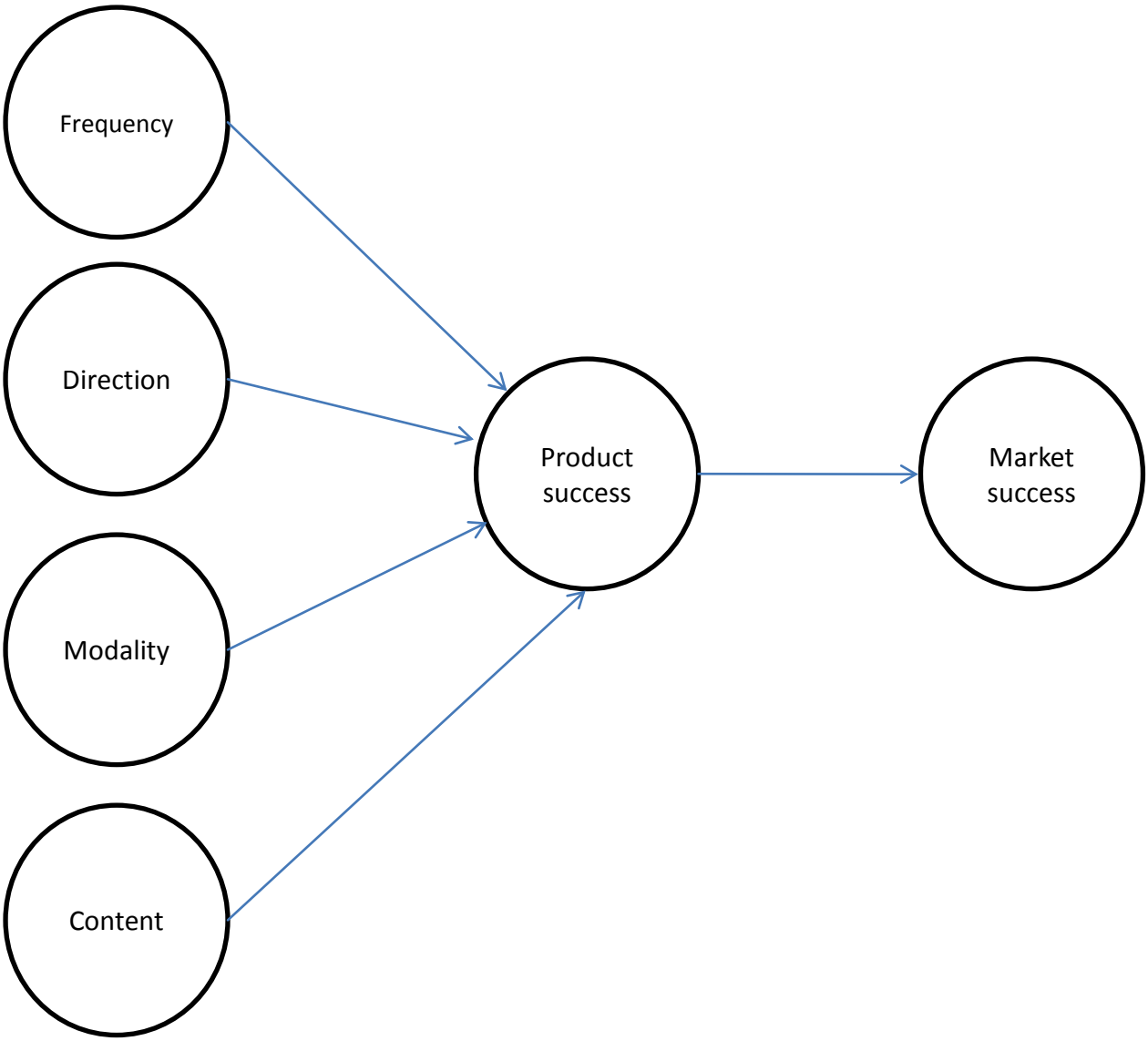

Figure 1. Conceptual model.

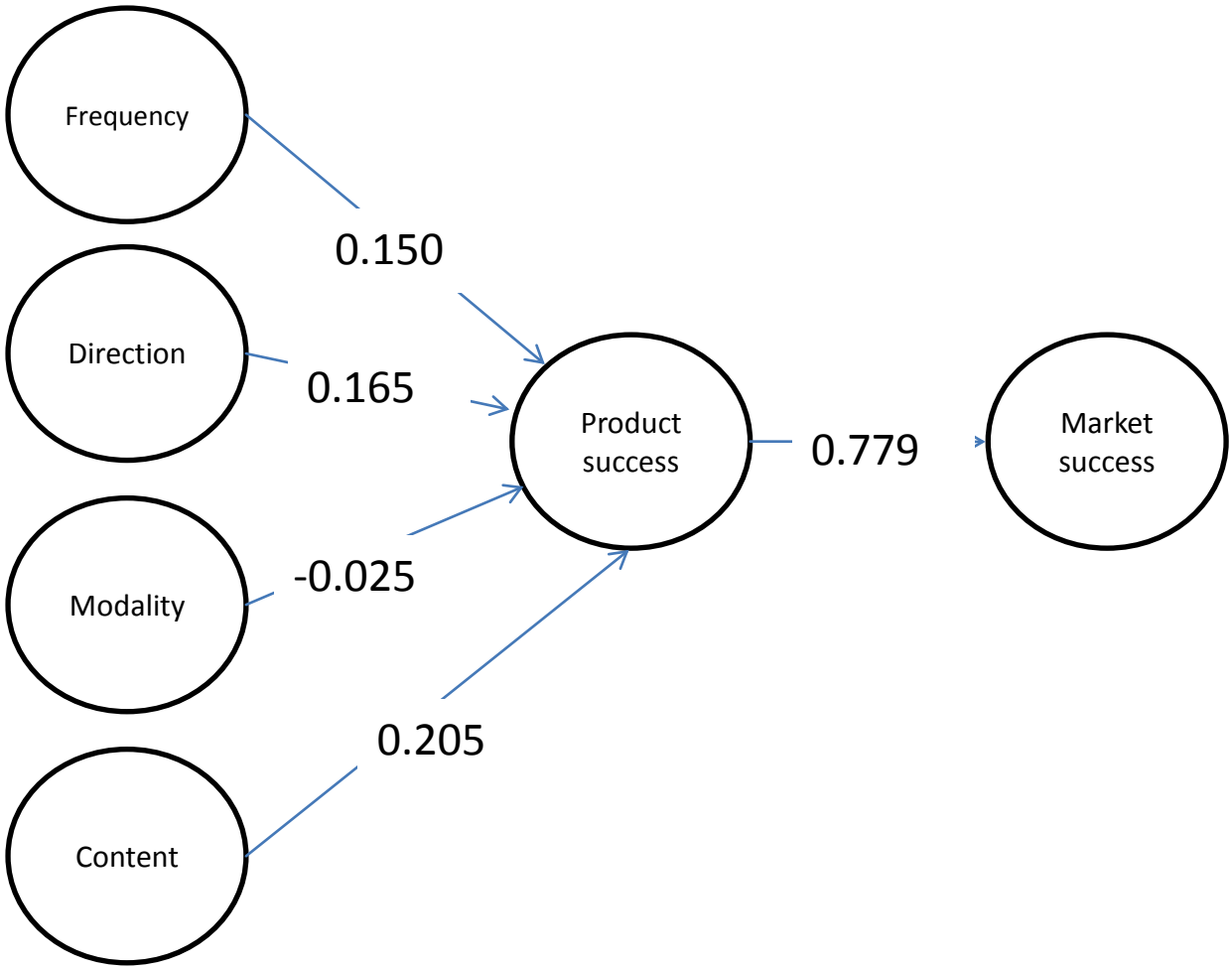

Figure 2. Conceptual model with results for incremental innovations.

Appendix I

Frequency	Loadings	Mean	Standard deviation
Ongoing feedback from customers	0.71	5.20	2.97
Many ideas were tested	0.80	5.18	2.70
Multiple experiments	0.83	4.99	2.88
Learning process of customer needs	0.86	4.42	2.60
Direction			
Communication and interaction leading to novel ideas	0.82	4.92	2.61
To reduce lead time, we have focused on collaboration	0.73	6.49	2.50
Open innovation system	0.61	2.40	1.91
Modality			
We solve critical aspects together with customers	0.82	4.43	2.76
A high degree of face-to-face communication	0.90	4.45	2.91
Customer suggest solutions to problems	0.78	5.17	2.88
Content			
Active customer involvement	0.84	5.05	2.95
Customers were involved early in the development process	0.81	4.40	2.88
Inspired by customer settings to generate ideas	0.83	6.88	2.62
Used customer feedback	0.77	6.69	2.59
Product Success			
Sales volume	0.88	6.14	1.97
Overall profitability	0.88	6.22	1.94
Profitability compared to goal	0.89	6.33	2.09
Market Success			
Market share compared to other own products	0.92	6.09	2.03
Market share compared to competitors	0.91	6.57	1.99
Market share compared to goals	0.68	6.38	2.75