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Research in Progress

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Abstract

Integrating customers into the innovation process is gaining popularity among companies as means of addressing competitive and market pressures. At the same time, companies are faced with the challenge of selecting appropriate customer integration methods to sustain customers' engagement and elicit contributions that are useful. We draw from previous research in consumer behaviour to identify customer experience as an important determinant of customers' overall participation in the design phase of the innovation process. Based on the compatibility principle, we propose a research model which examines the effect of a match between the type of product that customers are required to design, and the nature of customer experience (hedonic vs. utilitarian) they are provided with on their overall engagement with the customer integration process. A brief outline of the experimental study in which the proposed research model will be subsequently tested is presented. The aim of this research is to select and design appropriate web-based customer integration methods depending on the task that customers have to perform.

Keywords: Web-based customer integration, customer experience, hedonic experience, utilitarian experience, compatibility principle.

1 Introduction

Companies have to be innovative in order to stay competitive in the market place (Drucker, 1998). One approach for companies to innovate is to open up their innovation processes and leverage the knowledge of external stakeholders such as customers. This opening up of the innovation process is known as the open innovation approach (Chesbrough, 2003). In open innovation, customers can give input along different phases of the innovation process. Customer input can be in the form of the generation and evaluation of ideas and concepts in the early and middle phases of the innovation process, in the design of product or service variations, or in the evaluation of prototypes as the innovation nears production and market launch (Dahan and Hauser, 2002). Companies gather customer input through a variety of customer integration methods (CIM) like idea competitions, lead user or focus group workshops. In particular, technological advances and the proliferation of IT such as the Internet has resulted companies in using a lot of web-based CIMs (Jung et al., 2010).

These web-based CIMs make customer integration into innovation processes faster and more affordable (Erat et al., 2006, Füller et al., 2009). At the same time, many web-based CIMs fail to attract customer contribution, or fail to keep the customers engaged during the process of providing input (Kohler et al., 2011). This is of particular concern, as customers' engagement is primarily voluntary, and mostly customers do not stand to gain anything tangible for the effort expended in providing input. Therefore, from the perspective of the company integrating customers into their innovation process, it becomes imperative to provide customers with other forms of value from the customer integration process. For instance, customers could derive value from the experience of co-creating a product or service with the company (Holbrook, 1996, Holbrook, 1998, Prahalad and Ramaswamy, 2003). The experience customers gain not only helps in shaping the nature of their contribution, and in maintaining engagement, but can also influence their willingness to participate in customer integration projects in the future (Füller et al., 2011, Kohler et al., 2011). Thus, the nature of the experience that a customer gets can be an important determinant of the success of the whole customer integration project. Accordingly, companies need to pay particular attention towards selecting and designing the appropriate CIM to integrate their customers by focusing on the nature of experience that the CIM is able to provide to customers. Designing web-based CIMs that provide an appropriate customer experience is a multidisciplinary endeavour involving research findings on consumer behaviour and emotions from marketing as well as fast and accurate information processing and task execution from information systems and human-computer interaction (Tractinsky and Lowengart, 2007, Porat and Tractinsky, 2012).

Previous research on customer integration has primarily focused on the early phases of the innovation process where companies aim at generating and evaluating ideas for new products and services (Gassmann et al., 2005, Leimeister et al., 2009, Blohm et al., 2011, Huang et al., 2011). To this end, web-based CIMs such as virtual brainstorming (Nagasundaram and Bostrom, 1995, Jenkin et al., 2011) or idea competitions (Leimeister et al., 2009) are used to integrate the customer as a source of information and creative ideas. However, customers can assume a more active role as a co-creator or co-producer in the innovation process. In this role, customers can help the company in creating concepts or actually designing new products in the design phase of the innovation process (Nambisan and Baron, 2007). Since these tasks require more effort, time and expertise from the customer, it is even more important to fully engage customers into the customer integration activity by offering a compelling customer experience. Therefore, we will focus on investigating the role of customer experience in web-based customer integration into the design phase. Our research is guided by the question: *How does the nature of customer experience effect customer contribution in product design?*

In marketing and consumer research, customer experience is often classified as utilitarian and hedonic experience (Hirschman and Holbrook, 1982, Babin et al., 1994, Addis and Holbrook, 2001). However, the notion of customer experience has rarely been applied in the context of customer integration (Nambisan and Nambisan, 2008, Kohler et al., 2011, Nambisan and Watt, 2011). It is not clear as to how customer experience will influence customers' engagement and contribution towards designing a product using a particular web-based CIM. We would therefore, study the effect of providing different (utilitarian and hedonic) customer experiences on customers' engagement and contributions to the customer integration process. We draw upon the compatibility principle that proposes that stimuli have to match with the provided task in order to elicit appropriate response and higher levels of task performance (Fitts and Deininger, 1954, Kornblum and Lee, 1995). Applying the compatibility principle in the context of web-based customer integration, we propose a research model underlining the effects of a match between customer experience and customer integration task on customers' contributions and engagement. We further elaborate on the design of an experimental study which we plan to conduct to subsequently test our proposed research model. Our findings will extend understanding regarding the role of customer experience in the design, selection and application of appropriate CIMs for obtaining high quality input from customers in the design phase of the innovation process. The study will contribute to the field of human-computer interaction by

identifying stimuli (e.g. gamification, visualization) provided by web-based CIMs that activate different customer experience dimensions.

The remaining paper is structured as follows: Section 2 provides some theoretical background on the concepts of customer integration into innovation processes and customer experience. We introduce our research model in Section 3, and provide some initial descriptions of the research methodology with which we intend to validate the research model (Section 4). We conclude the paper by discussing the potential theoretical and practical contributions of this research.

2   Theoretical Background

2.1   Customer integration into innovation processes

Companies are increasingly changing their innovation strategies to "innovating with customers" rather than "innovating for customers" in response to competitive business environments, shortened product life cycles, and increasing cost and innovation pressures (Gassmann et al., 2005, Desouza et al., 2008). Customer integration is a valuable approach in new product and service development and can result in better fit with market needs and faster time to market (Erat et al., 2006). Customers can provide input to the different phases of the innovation process by creating and evaluating ideas and concepts, designing new products, or testing prototypes (Dahan and Hauser, 2002).

Customer inputs can be gathered by companies through the use of different CIMs. Based on the responsibilities and the role assumed by the customer in the innovation process (Cavaye, 1995), CIMs can be classified on a continuum ranging from *passive* to *active* customer integration (Alam, 2002, Schultze et al., 2007). Passive CIMs are surveys or ethnography where the customer serves as a source of information and innovative ideas. On the other end of the continuum, active CIMs such as lead user workshops, focus groups, toolkits, and innovation communities enable customers to actively execute tasks such as getting involved in the generation of ideas, and/or in the design of products or services (Füller and Matzler, 2007, Zogaj and Bretschneider, 2012). However, integrating customers into the innovation process is often organizationally complex and entails physical restrictions.

The emergence of modern information technologies such as the Internet and high speed broadband connections offer significant opportunities to companies to alleviate some of the organizational and physical problems faced in customer integration into innovation processes (Parameswaran and Whinston, 2007). The Internet makes customer integration faster and more affordable. Web-based tools increase interactivity and flexibility, enhance access to customers and therefore the size and scope of absorbable customer knowledge (Erat et al., 2006, Roberts and Grover, 2012). For integrating customers into the product design phase, digital environments provide customers with a wide range of options for incorporating their ideas. For instance, customers can make minor changes to existing products or suggest more radical ones, choose between different product attributes or design the product entirely by themselves (Prandelli et al., 2006).

Virtual concept testing (VCT) is an example for a web-based CIM where participants are shown new product concepts and are asked to express their preference by purchasing the most favoured concept at a certain price. VCT therefore allows companies to compare and evaluate different concepts before carrying them forward and launching them in the marketplace. Further, through the use of different multimedia options such as images or videos, VCT provides a low-cost alternative of testing virtual prototypes, rather than real physical prototypes (Dahan and Hauser, 2002).

In order to make web-based customer integration successful, it becomes important to understand how web-based CIMs have to be designed in order to provide user-friendly and enjoyable experiences to

customers so that they remain engaged and interested over the customer integration process, and therefore provide input which is of value to companies.

2.2   Customer experience

Providing superior customer experience is a central objective for many companies, as this can result in brand loyalty, increased sales, and higher market shares (Nambisan and Nambisan, 2008). Research in social science and psychology indicates that people are more likely to approach environments where they experience pleasure and avoid those that generate feelings of displeasure (Russell and Mehrabian, 1978). Accordingly, there has been a focus on identifying the antecedents and consequences of customer experience, as well as the different kinds of experience that can be provided to customers (Verhoef et al., 2009). In this context, the different forms of experience are outlined in Table 1.

Customer experience has been studied in terms of *consumer's purchase and consumption experience* in the field of marketing and consumer research. Here, customer experience was found to be determined by two basic dimensions, utilitarian and hedonic experience (Hirschman and Holbrook, 1982, Babin et al., 1994, Noble et al., 2005, Overby and Lee, 2006). Utilitarian customer experience is an outcome of utilitarian consumer behaviour, which can be defined as task-related and goal-oriented. Thus, utilitarian shopping experience depends on task completion (shopping list) and product purchase in a deliberate, efficient, and fastidious manner. In contrast, the defining aspects of hedonic shopping are more related to fun, pleasure or playfulness that result from the activity (Babin et al., 1994).

Experience	Research field	References
Purchase, consumption experience of consumers (hedonic, utilitarian experience)	Marketing, consumer research	Babin et al. (1994) Hirschman and Holbrook (1982)
User experience	Human-computer interaction	Hassenzahl and Tractinsky (2006) Law et al. (2009)
Compelling co-creation experience	Marketing, technology innovation management, information systems	Füller et al. (2009) Füller et al. (2011) Matzler et al. (2011)

Table 1.   Research streams on customer experience.

In the context of developing IT systems, *user experience* has been researched within the domain of human-computer interaction. User experience refers to the experience individuals have when using and interacting with the Web, software, or IT systems. This research is based on the notion that for the development of IT systems not just the traditional usability framework but also users' feelings and motivation need to be considered (Law et al., 2009). As a means of providing more hedonic and intrinsically motivating systems, gamification has gained significant research interest (Hamari, 2013).

Given the importance of customer experience in determining customers' ongoing engagement with a company, antecedents of a *compelling customer experience* that motivates customers to participate in web-based customer integration have been identified. Web-based CIMs need to be designed in a manner that empowers customers with varying capabilities to solve the given co-creation tasks (e.g. design of a product, creation of ideas). Further antecedents of a compelling co-creation experience are perceived autonomy (freedom to make choices and express creativity), sense of community (meet and connect to people), or ease of use of the web-based CIM (Füller et al., 2011, Matzler et al., 2011).

Despite acknowledging the role of compelling co-creation experience in customer integration, there is paucity of research that has considered designing and evaluating web-based CIMs that incorporate the two major customer experience dimensions (hedonic and utilitarian) as means for providing a compelling co-creation experience.

Product type

Frequently the experience customers gain depends on the type of product and its features (Gentile et al., 2007). Analogous to the differentiation in utilitarian and hedonic customer experience dimensions, in marketing literature a widely accepted distinction of products is made in utilitarian and hedonic types of products (Hirschman and Holbrook, 1982, Dhar and Wertenbroch, 2000, Addis and Holbrook, 2001, Okada, 2005, Gentile et al., 2007). *Hedonic products* are defined as products that evoke heightened levels of fantasies and emotions such as fun. Examples for hedonic products are movies, music CDs, books, sport cars, designer clothes, or luxury watches (Dhar and Wertenbroch, 2000, Addis and Holbrook, 2001, Sen and Lerman, 2007). On the contrary, the core value of *utilitarian products* such as washing machines, dishwashers, or printers lies in providing functionality (Hirschman and Holbrook, 1982, Sen and Lerman, 2007). Emotions do not affect whether and how the product works (Dhar and Wertenbroch, 2000, Addis and Holbrook, 2001). Utilitarian and hedonic products can have both objective/functional features as well as subjective/experiential ones. As for each product one aspect is dominating, a product can be categorized as being either utilitarian or hedonic (Dhar and Wertenbroch, 2000, Addis and Holbrook, 2001). For our research, in addition to distinguishing between utilitarian and hedonic dimensions of customer experience, we will also distinguish between utilitarian and hedonic types of products. This approach is consistent with previous research of Dhar and Wertenbroch (2000), Okada (2005), O'Curry and Strahilevitz (2001), Madlberger and Nakayama (2013), and Hirschman and Holbrook (1982).

3 Research Model

Our research will examine the role of customer experience in determining customers' contributions to the innovation process using web-based CIMs. In particular, we will investigate how the nature of customer experience (hedonic or utilitarian) provided to customers interacts with the type of the product (hedonic or utilitarian) that they are required to virtually design in determining the outcome of the design task. Figure 1 depicts the research model we intend to test in an experimental setting.

We rely on the compatibility principle whose basic idea is that stimuli that match with the provided task evoke appropriate response (Fitts and Deininger, 1954, Kornblum and Lee, 1995). For instance, vocal response is faster when the given stimulus is auditory, whereas a visual response is faster after a pointing-stimulus (Shafir, 1993). When extended to the domain of marketing, the compatibility principle suggests that stimuli have to match with the product type (utilitarian/hedonic product). Consumers weight various store attributes differently depending on the products or services offered by those stores (Tractinsky and Lowengart, 2007). To promote hedonic shopping, web-stores need to create feelings of fantasy, arousal and enjoyment (Tractinsky and Lowengart, 2007). In the case of food shopping which is a strongly goal-oriented task of utilitarian product purchase, more performance-oriented characteristics of grocery-store design are important (Childers et al., 2001). Similarly, the stimuli provided in advertising have to fit the advertised product. For utilitarian products, advertisement needs to be convincing and a problem-solving format focusing on the main benefits of the product is most suitable. In contrast, hedonic products have to be advertised in an emotionally appealing manner (Eisend, 2009).
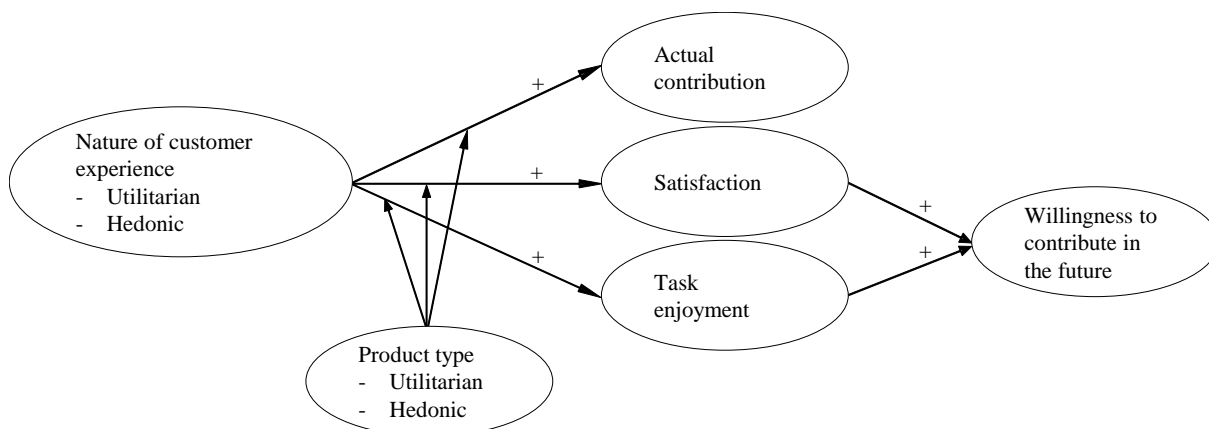
Figure 1.   Research Model.

Extending the compatibility principle in the context of web-based customer integration, we postulate that the stimuli provided to customers in the form of various aspects of the web-based CIM will influence customers' response, depending on whether there is a match between the stimuli and the task that they are required to perform in terms of the type of product they design. Therefore, our research model is based on the following proposition:

> ***A match between the nature of customer experience provided by the web-based CIM and the product type will result in a positive effect on customers' response in terms of actual contribution to the innovation process, satisfaction, task enjoyment, and willingness to contribute in the future.***

For the design of hedonic products customers prefer a hedonic customer experience. Since hedonic products are highly related with emotions, feelings, and fantasies, the design of hedonic products requires web-based CIMs to provide a playful and mentally stimulating environment that evokes emotions such as fun. For the design of utilitarian products, however, the web-based CIM needs to create a utilitarian experience that facilitates the customer in acquiring information on the underlying product and its functionalities.

Given that a match between stimulus and task makes performance easier, faster, and more accurate (Fitts and Deininger, 1954, Kornblum and Lee, 1995), we assume a positive effect of a match (e.g. utilitarian customer experience and utilitarian product) on customers' contributions measured in terms of the *actual contributions* made (e.g. quantity of product designs) (Füller et al., 2011). The contribution that customers make to the innovation processes is the most important factor determining overall success of a customer integration project. Thus, for companies it is crucial to understand the factors that influence the quality and quantity of customers' contributions (Jung et al., 2010).

Customers derive *satisfaction* from successfully completing a task (Füller et al., 2011). For utilitarian, primarily function-oriented products such as laptops or flashlights customers need to acquire information on the product's functionalities and how it works. Therefore, the web-based CIM needs to create a utilitarian customer experience that serves this need and facilitates the customer in completing his customer integration task. A match of customer experience and product type that allows customers to successfully complete tasks and derive a feeling of accomplishment leads to higher levels of satisfaction with the overall customer integration process (Füller et al., 2011).

Task enjoyment refers to the degree to which individuals perceive a task as enjoyable (Dahl and Moreau, 2007). Proper stimuli of the web-based CIM create a customer experience that eases the customer integration task and therefore makes it more enjoyable. Thus, individuals who feel supported by the provided customer experience may perceive higher levels of enjoyment of the virtual product design task (Füller et al., 2009).

Individuals' previous experience with customer integration will determine their *willingness to contribute* to innovation processes through creating ideas or designing products in the future (Füller et al., 2011). Positive feelings such as enjoyment and satisfaction derived from web-based customer integration have a positive effect on customers' willingness to contribute to similar customer integration projects in the future (Oliver, 1980, Mittal and Kamakura, 2001, Füller et al., 2009). In contrast, web-based customer integration that evokes feelings of frustration or incompetence due to failure in task-completion will most likely be avoided by customers in the future (Füller et al., 2011). Thus, a match of the product type and the nature of customer experience positively impacts customers' satisfaction and task enjoyment, which in turn enhances willingness to contribute to further web-based customer integration projects. The above stated proposition can be used to develop testable hypotheses which correspond to the research model.

4 Research Methodology

We will test the proposed research model in an experimental setting. A laboratory experiment enhances internal validity by allowing the manipulation of the factors that are of interest to the study, and controlling all other factors that are not a part of the research model. In our research model, customer experience is a factor with two values – *hedonic* and *utilitarian* experience. Customer experience will be operationalized through a web-based CIM that provides different kinds of experience to customers. Similarly, product type will also have two values – *hedonic* and *utilitarian* product type. We will draw upon marketing and consumer research literature to identify hedonic and utilitarian products, which will then be incorporated in our experimental tasks. Therefore, the experiment has a 2x2 factorial design. Participants will be randomly assigned to one of our four treatment groups. Each subject will be given the task of coming up with different design variations of a particular product using a web-based CIM that allows them to modify features and attributes, and provides them with various product-related information. In the following we describe how we intend to activate utilitarian or hedonic customer experience dimensions in our experiment. Further, we provide information on how we plan to measure the moderating and dependent variables.

Operationalization of utilitarian and hedonic customer experience in a web-based CIM

We will design and use a web-based CIM that creates two different customer experiences. The web-based CIM will enable customers to select, combine, and design different product attributes. Utilitarian customer experience refers to the customer's experience in realizing product-related informational goals (Nambisan and Nambisan, 2008). Therefore, we will keep the user interface as simple as possible. Further, we will make product-related information easy to access. For instance, information on various product attributes and how they affect the product's overall functionality will be provided. In order to operationalize hedonic customer experience, the design of the web-based CIM to gather product designs will incorporate playfulness through game elements. Additionally, interactive three-dimensional visualizations will show the effects of selecting and combining different product attributes (Childers et al., 2001, Kohler et al., 2011). For both, utilitarian and hedonic customer experience, participants will be provided with tutorials guiding them through the initial steps to get familiar with the web-based CIM. After the experiment, we will use a questionnaire to assess if the hedonic/utilitarian web-interfaces were indeed perceived as being more pleasant/enjoyable or useful/helpful (Batra and Ahtola, 1990) by the subjects. This will ensure that our treatments (hedonic and utilitarian websites) were indeed effective. Further, the trial run will also serve the purpose of testing and ensuring that both versions of the web-based CIM are perceived equal in terms of usability.

Measurement of dependent variables

Among the dependent variables, *satisfaction, task enjoyment, and willingness to contribute in the future* will be measured using existing scales chosen from previous research (e.g. Dahl and Moreau, 2007, Füller et al., 2001, and others). These will be measured using a post-experimental questionnaire.

Actual contribution of the participants will be objectively measured in our experimental setup. The experimental log data will be analysed to determine the time subjects spent in performing the task, the number of product modifications they made to the product design, and the time needed for each modification.

Control variables

According to Hirschman and Holbrook (1982), some individuals are more eager to seek sensory-emotional and/or cognitive information stimulation. Therefore, we control for customer characteristics that might influence a customer's preference for a utilitarian/hedonic customer experience for the task of designing utilitarian/hedonic products. Further control variables are age, gender, product involvement, and previous experience with web-based customer integration or product design.

5   Conclusion

As companies embrace the notion of open innovation as means of overcoming some of the competitive and market pressures that they face, they are increasingly faced with the challenge of sustaining customers' engagement and willingness to provide meaningful input across the innovation process. Our research attempts to address this challenge, in particular in the context of integrating customers into the design phase of the innovation process using web-based CIMs. Drawing from previous research on consumer behaviour and the compatibility principle, we postulate that a match between the kind of experience that customers get and the particular product design task that they have to perform, will have a positive effect on their contributions, and also on their satisfaction, enjoyment and willingness to contribute towards the design of the product. This research-in-progress paper presents the proposed research model which we plan to test empirically in an experimental setting. We also present some initial ideas on how the experiment will be designed and conducted.

The findings from this study are likely to have significant implications along various dimensions. Firstly, the underlying research will contribute to theory by investigating the design phase of the innovation process that is less researched compared to the early phases of idea generation. Further, this study will broaden the body of knowledge on customer integration by applying the concept of utilitarian and hedonic experience to web-based customer integration in order to study the outcomes of an appropriate customer integration experience. Finally, we apply the compatibility principle, which has previously mostly been used in the domains of consumer behaviour and marketing, to a new research context. Based on the compatibility principle, we provide a research model that proposes that stimuli provided to customers in the form of various aspects of the web-based CIM have to match with the customer integration task in order to elicit high quality input from customers.

From a practical perspective, the findings of this research will provide insights regarding the design of web-based CIMs that are suited for different customer integration tasks. By identifying stimuli such as gamification that activate different customer experience dimensions and deriving design guidelines for web-based CIMs to provide the appropriate customer integration experience we contribute to the domain of human-computer interaction.

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