Association for Information Systems
AIS Electronic Library (AISeL)

Summer 10-6-2011

VALUE CO-CREATION WITH CUSTOMERS THROUGH DESIGN TOOLKITS: THE IMPORTANCE OF PREFERENCE FIT AND PSYCHOLOGICAL OWNERSHIP

Tingru Cui

Hua Ye

Hock Hai Teo

Follow this and additional works at: http://aisel.aisnet.org/ecis2011

VALUE CO-CREATION WITH CUSTOMERS THROUGH DESIGN TOOLKITS: THE IMPORTANCE OF PREFERENCE FIT AND PSYCHOLOGICAL OWNERSHIP

Tingru CUI, Hua YE, Hock Hai TEO
National University of Singapore

Abstract

The information technologies increasingly enable companies to set up websites for customers to design and purchase their own individualized products. Although customer co-design offer benefits for both suppliers and customers, how to manage the co-design process, especially the central interface features of design toolkit have emerged as a contentious issue among researchers and practitioners. This paper focuses on the effects of both utilitarian and psychological customer-design product value (i.e., perceived preference fit and psychological ownership) on customers' purchase decision. Based on the self-determination theory, we propose that the effectiveness of the value increment mechanisms is influenced by three leading toolkit characteristics – the reusability of the peer-generated design solutions, design autonomy, and peer feedback, which represent three important stages in the design process, i.e., idea generation, configuration, and outcome evaluation. Laboratory experiment will be carried out to test the hypotheses. This study attempts to extend the self-determination theory to the online co-design context and to explore the value of customer-designed product through psychological ownership. It also intends to suggest pragmatic strategies for companies to improve co-design process and promote their product sale.

Keywords: Customer Co-design, Design Toolkit Characteristics, Self-Determination Theory, Psychological Ownership Theory.

1 Introduction

How to create and deliver superior customer value is an everyday concern of practitioners (Franke et al. 2009). Among the mechanisms of value creation, including customers into the product design process has been increasingly taken as a promising strategy to co-create value with customers (von Hippel 2001). Customer co-design refers to a process that customer chooses a personalized combination of product attributes from a list of components (Franke et al. 2009). This mechanism of value co-creation provides substantial benefits to companies by reducing design costs and attracting customers (von Hippel 2001). In order to reap the benefits, organizations developed design toolkit to facilitate and create a positive design experience for customers (von Hippel 1998). However, as demonstrated by the spectacular failures in Levi Strauss's "Original Spin Jeans" and Mattel's "My design Barbie", firms encounter difficulties in supporting the customer design process (Franke and Piller 2004). Moreover, some researchers have expressed doubts that empowering customers with design toolkit generates value for customers (Zipkin 2001). They concerned that users may feel information overloaded during the product configuration. Therefore, it is important to explore how to effectively use design toolkit to support the value co-creation process.

Previous research investigating customer product self design has largely focused on the utilitarian value increment as they fit better to individual preferences (Dellaert and Stremersch 2005; Squire et al. 2006; von Hippel 2001). However, as some studies proposed, the increased value is not delivered exclusively as utilitarian (Schreier 2006). Recent studies had empirically assessed the psychological value of the self-designed products (Franke et al. 2010; Fuchs et al. 2010). Nevertheless, these studies did not systematically examine what influences the value increment mechanisms, especially how the design toolkit features influence the preference fit and formation of psychological ownership.

This study aims to address the knowledge gap by investigating *how design toolkit features affect the customers' value co-creation and thus their willingness to pay intention*. Based on self-determination theory and psychological ownership theory, we develop a model to explain the influence of toolkit characteristics on customers' willingness to pay for the self-designed products through the preference fit and psychological ownership. The three characteristics are *reusability of peer-generated solutions*, *design autonomy*, and *peer feedback*. This study is expected to contribute to the literature by testing the effects of specific design toolkit features and exploring the theoretical mechanism underlying the value increment of customer-designed products. The findings of this study may also inform practitioners for developing effective functionality of design toolkit to facilitate customer co-design.

2 Theoretical Foundation

2.1 Self-Determination Theory

Self-determination theory (SDT) proposes that the extent to which three innate psychological needs (i.e., competence, autonomy, and relatedness) are fulfilled influences the extent to which the motivation adopted by the individual is considered self-determined (Deci and Ryan 2000). It also suggests that self-determined motivation leads to a better performance and higher satisfaction (Baard et al. 2004; Deci et al. 1989; Ryan and Deci 2000). In other word, fulfilling these needs will lead people to efficient performance and higher satisfaction (Deci and Ryan 1980). Here, we posit design toolkit characteristics that fulfil these needs may result in a positive user outcome. Specifically, the need for competence implies that people have a tendency to be effective in their interactions with and exert control over the environments when they perform an activity. The need for autonomy concerns the individuals' innate desire to self-organize actions, i.e., they can behave volitionally and free from external control (Deci and Ryan 1980). The need for relatedness refers to feel connected and supported by others, to having a sense of belongingness with people in one's community (Ryan and Deci 2000).

SDT has been applied to explain psychological well-being, student learning (Standage et al. 2003), and employee performance (Bono and Judge 2003). These studies have empirically confirmed that

fulfilling these needs positively affects individuals' satisfaction and performance. Despite increasing use of SDT in the psychology and management literature, limited number of IS research has attempted to evaluate the effects of varying levels of self-determination on knowledge contribution behaviour (Kwok and Gao 2004) and e-learning performance (Roca and Gagne 2008). Similarly, in the context of online customer product design, we expect that fulfilling these needs may lead to positive outcomes and the design toolkit serves as the significant technique to support the fulfilment.

2.2 Psychological Ownership Theory

Psychological ownership is defined as the state in which individuals feel as though the target of ownership is "theirs" (i.e., "It is mine!") (Pierce et al. 2003). It reflects a close emotional relationship between an individual and an object. Through interaction with the object, individuals' sense of identity and self definition can be reflected and transformed on to the object (Avery et al. 2009). The sense of psychological ownership makes individuals believe the object symbolically enriches their identity and becomes the extended self (Franke et al. 2010).

Researchers have begun to examine the relationship between psychological ownership and the desired outcomes such as organizational citizenship behaviours (Pierce et al. 2003) and customer behaviours (Franke et al. 2010). For example, it is found that customers experience the feeling of psychological ownership and are more willing to buy for the product when they are integrated into the new product development process (Fuchs et al. 2010). Hence, in this study, we propose psychological ownership represents an important aspect of value customers assign to the products they designed.

3 Research Model and Hypotheses

Based on SDT and psychological ownership theory, we propose a research model shown in Figure 1.
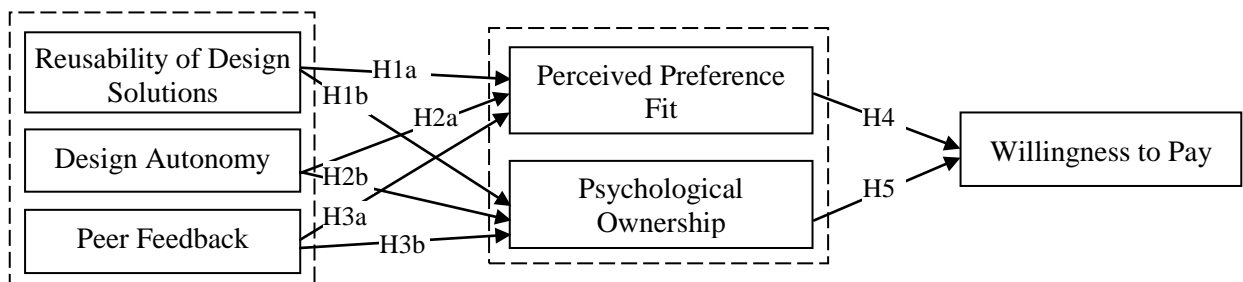

Figure 1.   Research Model

3.1 Perceived Preference Fit

Perceived reference fit refers to the degree to which the customers' individual requirements for products are fulfilled. This functional benefit has been taken as the prime argument in favor of customer involvement in product design (Dellaert and Stremersch 2005). Compared to the standard product, the individualized product is much closer to customers' particular needs and leads to a high level of satisfaction with the product (Franke et al. 2010). Therefore, we expect:

H1: *Perceived preference fit is positively related to willingness to pay.*

3.2 Psychological Ownership

Through design process, customers incorporate the product into their extended self by materializing their ideas and fulfilling their needs for imagination. Thus, the feeling of psychological ownership has been developed. If separating the design products with customers, they may feel lost with their identity and are more likely to search for the lost part (Pierce et al. 2003). A stronger feeling of psychological

ownership leads to a higher appraisal of the product's value and thus customers are more likely to pay for it (Fuchs et al. 2010). Therefore, we expect:

H2: *Psychological ownership is positively related to willingness to pay.*

3.3 Reusability of Peer-generated Design Solutions

Reusability of peer-generated design solutions is defined as the extent to which the design toolkit provides users previous customer design outcomes and the ability to reuse part of them. Peer-generated solutions are a source of inspiration for idea generation, which helps customers to construct or identify their preference effectively (Purcell and Gero 1996). Besides, being able to integrate components, customers feel they are able to control the design. It leads to customers' feeling of being competent to solve the design task, i.e., user competence. As the design competency is increased, the effectiveness with which users can customize products to their needs increases and a more positive self-design outcome will be achieved (Deci and Ryan 1980). Therefore, we hypothesize:

H3a: *The availability and reusability of peer-generated design solutions is positively related to the perceived preference fit of customer-designed product.*

Reusability of peer-generated design solutions could render customers a sense of control and competency in designing their own products. It is argued that the more customers are able to exercise control over the object, the more it will be experienced as part of the self (Furby 1991). Besides, through the interactive process with the designed product, customers might then attribute the outcome more to their own accomplishment (Fuchs et al. 2010). Thus, customers tend to have an emotional attachment towards the resulting product. Therefore, we expect:

H3b: *The availability and reusability of peer-generated design solutions is positively related to psychological ownership of customer-designed product.*

3.4 Design Autonomy

Design autonomy refers to the degree of freedom that customers are given during the configuration process. Endowed with a high level of design autonomy, customers have the freedom to input text, upload their own pictures from external resources rather than just choose from components provided by suppliers. So customers are able to configure freely what they have imagined and materialize their ideas through autonomous design. It is beneficial for them to fulfil their unique requirements and consequently leads to a closer preference fit. Therefore, we expect:

H4a: *The level of design autonomy is positively related to the perceived preference fit of customer-designed product.*

With a high level of design autonomy, customers may add in highly personalized and symbolic elements into the design. It increases the uniqueness of the design outcome and reflects the meaning or self identity of the designer. The self designed products are consistent to designers' self concept and perceived as an extended self (Van Dyne and Pierce 2004). Hence, customers will have a feeling of ownership towards the design outcome. Therefore, we expect:

H4b: *The level of design autonomy is positively related to psychological ownership of customer-designed product.*

3.5 Peer Feedback

Peer feedback refers to the extent of interaction between customers and peers about the designed products. This functionality can satisfy the need for relatedness since it serves as a link for users to be connected with peers by allowing them to receive comments from and interact with peers. According to SDT, fulfilling the need of relatedness will lead individuals to have a higher level of satisfaction and better performance. Besides, peer feedback helps customers to improve their design and accomplish a

more successful outcome satisfying their demands. So the perceived preference fit is likely to be affected by the peer feedback function enabled by the toolkit. Thus, we hypothesize that:

H5a: *The availability of peer feedback is positively related to the perceived preference fit of customer-designed product.*

Through interaction with people in the design community, customers may gain a sense of connected and supported by others who share the same interest. The relatedness may lead them to form socially shared meaning ascribed to the design process as well as the design product (Ryan and Deci 2000). The product would become part of self-identity. Besides, they may understand themselves and develop self identity from the perspective of how others view them through comments (Avery et al. 2009). Thus, they are more likely to have the feeling of owning the product.

H5b: *The availability of peer feedback is positively related to psychological ownership of customer-designed product.*

4　Research Methodology

4.1　Experimental Context

The hypotheses proposed in the present study will be tested through a laboratory experiment with a 2 × 2 × 2 design (i.e., with/without reusability of peer-generated design solutions ×2 levels of design autonomy × with/without of peer feedback). The experimental design resulted in eight cells. Short-sleeve T-shirt is served as the design product (price for different design formats would be the same). Subjects will choose a personalized combination of T-shirt attributes from a list of components provided by the website (see the website interface illustration below).

Figure 2. Website Interface Illustration

4.2　Manipulations

For reusability of peer-generated design solutions, it is operationalized at two levels: available and not available. In the condition that peer-generated design solutions are not provided by toolkits, customers need to create design idea all by themselves or search for inspiration from external resources. In the condition with this function, previous design solutions generated by peer are displayed for evaluation and customers are empowered to reuse the design component from these solutions.

For design autonomy, it is manipulated as two levels: high and low. At the low level, customers can just choose from design components provided by the product company. At the high design autonomy level, subjects are allowed to input text, upload their own pictures from external resources.

For peer feedback, it is also manipulated as available and not available. For condition without peer feedback, the design toolkit does not provide direct method for customers to share their designed product with others. Customers can only obtain feedback from offline or by employing other

communication mediums. For condition with peer feedback, customers are able to leave comments on others' design and meanwhile acquire comments from other users in this website.

4.3 Experiment Procedure

We will firstly conduct a pilot test, which may help us finalize the manipulation, and refine experimental procedures and instructions (Perdue and Summers 1986). In the pilot study, 30 graduate students will be recruited and asked to perform a T-shirt design task. Then they will be requested to fill out a questionnaire including manipulation checks and demographic variables.

In the main study, all subjects will begin the experiment by answering their personal information. Then they will be randomly assigned to one of eight groups. The subjects will be presented with the description of the T-shirt design service provided by the website and be requested to complete a T-shirt design task. After that, we will measure various research constructs through a questionnaire. The estimated time to complete the experiment is 40-45 minutes.

Instrument was developed by adopting and adapting existing validated scales (see Table 1).

Construct	Item Description (1-7 Likert scale, 1=Strongly disagree, 7=Strongly agree)	Reference
Perceived preference fit (PPF)	PPF1: I like the design of the T-shirt. PPF2: The T-shirt design comes close to my idea of a perfect design. PPF3: The design of the T-shirt looks really great.	Adapted from Randall et al. (2007)
Psychological ownership (PO)	PO1: Although I do not legally own the T-shirt yet, I have the feeling that they are "my" T-shirts. PO2: The T-shirt I designed incorporates a part of myself. PO3: I feel that these products belong to me. PO4: I feel connected to the T-shirt. PO5: I feel a strong sense of closeness with the T-shirt.	Adapted from Peck and B. (2009); Van Dyne and Pierce (2004)
Willingness to pay (WTP)	WTP1: Imagine you could now buy one of these T-shirts, how much would you pay for the one you designed? WTP2: How much would you be willing to pay for one of your self-designed T-shirt?	Adapted from Fuchs et al. (2010)

Table 1.   Operationalization of Constructs

5   Expected Contributions and Conclusion

This study advances theoretical development on consumer co-design process in three important ways. Firstly, few studies have applied the SDT to investigate the IT-supported user activities. This theoretical lens would provide a new perspective to explore the user product co-creation phenomenon. Based on SDT, we derive the IT artefacts and causally link them to the value of customer-designed products. Secondly, we intend to extend the psychological ownership literature by exploring the antecedents of psychological ownership from the perspective of self-determination in the online product design context. Thirdly, the value of consumer-designed products constitutes a research field with supreme importance for the success of co-design applications. We extend this line of research by shedding light on the theoretical mechanism underlying the value increment of consumer-designed products. We will consider the increased value from both the cognitive and affective perspectives.

Practically, we attempt to identify and test the influence of three IT artefacts. Through providing or improving the three IT artefacts, organizations can attract more customers to purchase and elicit higher price for the product designed.

In conclusion, as a study in progress, we have completed the model development, toolkit design and will test our hypotheses by laboratory experiment using subjects from a public university. This study serves as an initial attempt to investigate the role of toolkit design features in the customer co-design process. This study suggests that future research in this direction is both theoretically important and practically interesting.

References

Avery, J.B., B.J. Avolio, C.D. Crossley, F. Luthans. 2009. Psychological Ownership: Theoretical Extensions, Measurement and Relation to Work Outcomes. Journal of Organizational Behavior 30(2) 173-191.

Baard, P.P., E.L. Deci, R.M. Ryan. 2004. Intrinsic Need Satisfaction: A Motivational Basis of Performance and Weil-Being in Two Work Settings. Journal of Applied Social Psychology 34(10) 2045-2068.

Bono, J.E., T.A. Judge. 2003. Self-Concordance at Work: Toward Understanding the Motivational Effects of Transformational Leaders. Academy of Management Journal 46(5) 554-571.

Deci, E., J. Connell, R. Ryan. 1989. Self-Determination in a Work Organization. Journal of Applied Psychology 74(4) 580-590.

Deci, E., R. Ryan. 1980. The Empirical Exploration of Intrinsic Motivational Processes. Advances in Experimental Social Psychology 13 39-80.

Dellaert, B., G. C., S. Stremersch. 2005. Marketing Mass-Customized Products: Striking a Balance between Utility and Complexity. Journal of Marketing Research 42(2) 219-227.

Franke, N., K. Peter, C.J. Steger. 2009. Testing the Value of Customization: When Do Customers Really Prefer Products Tailored to Their Preferences? Journal of Marketing 73(5) 103-121.

Franke, N., F. Piller. 2004. Toolkits for User Innovation and Design: An Exploration of User Interaction and Value Creation. Journal of Product Innovation Management 21(6) 401-415.

Franke, N., M. Schreier, U. Kaiser. 2010. The "I Designed It Myself" Effect in Mass Customization. Management Science 56(1) 125-140.

Fuchs, C., E. Prandelli, M. Schreier. 2010. The Psychological Effects of Empowerment Strategies on Consumers' Product Demand. Journal of Marketing 74(1) 65-79.

Furby, L. 1991. Understanding the Psychology of Possession and Ownership: A Personal Memoir and an Appraisal of Our Progress, Journal of Social Behavior & Personality 6(6) 457-463.

Kwok, J.S.H., S. Gao. 2004. Knowledge Sharing Community in P2P Network: A Study of Motivational Perspective. Journal of Knowledge Management 8(1) 94-102.

Peck, J., S.S. B. 2009. The Effect of Mere Touch on Perceived Ownership. Journal of Consumer Research 36(3) 434-447.

Perdue, B.C., J.O. Summers. 1986. Checking the Success of Manipulations in Marketing Experiments. Journal of Marketing Research 23(4) 317-326.

Pierce, J.L., T. Kostova, K.T. Dirks. 2003. The State of Psychological Ownership: Integrating and Extending a Century of Research. Review of General Psychology 7(1) 84-107.

Purcell, T.A., J.S. Gero. 1996. Design and Other Types of Fixation. Design Studies 17(4) 363-383.

Randall, Taylor, T. Christian, K.T. U. 2007. User Design of Customized Products. Marketing Science 26(March/April) 268-283.

Roca, J.C., M. Gagne. 2008. Understanding E-learning Continuance Intention in the Workplace: A Self-determination Theory Perspective. Computers in Human Behavior 24 1585-1604.

Ryan, R., E. Deci. 2000. Self-determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-being. American Psychologist 55(1) 68-78.

Schreier, M. 2006. The Value Increment of Mass-customizied Products: An Empirical Assessment. Journal of Consumer Behaviour 5(4) 317-327.

Squire, B., S. Brown, J. Readman, J. Bessant. 2006. The Impact of Mass Customisation on Manufacturing Trade-offs. Production and Operations Management 15(1) 10-21.

Standage, M., J.L. Duda, N. Ntoumanis. 2003. A Model of Contextual Motivation in Physical Education: Using Constructs From Self-Determination and Achievement Goal Theories to Predict Physical Activity Intentions. Journal of Educational Psychology 95(1) 97-110.

Van Dyne, L., J.L. Pierce. 2004. Psychological Ownership and Feelings of Possession: Three Field Studies Predicting Employee Attitudes and Organizational Citizenship Behavior. Journal of Organizational Behavior 25(4) 439-460.

von Hippel, E. 1998. Economics of Product Development by Users: The Impact of "Sticky" Local Information. Management Science 44(5) 629-644.

von Hippel, E. 2001. User toolkits for innovation, Journal of Product Innovation Management 44(5) 629-644.

Zipkin, P. 2001. The Limits of Mass Customization. Sloan Management Review 42(Spring) 81-87.