Original Research Article

The effect of co-design and flow experience on customer satisfaction and purchase intention online

Wei-ping Pu¹, Kuohsiang Chen² and Meng-Dar Shieh³

¹Institute of Creative Industries Design, National Cheng Kung University, No.1, University Road, Tainan City 701, Taiwan (R.O.C.)
²Department of Creative Product Design, I-Shou University, No.1, Sec. 1, Syuecheng Rd., Dashu District, Kaohsiung City 840, Taiwan (R.O.C.)
³Department of Industrial Design, National Cheng Kung University, No.1, University Road, Tainan City 701, Taiwan (R.O.C.)

*Corresponding Author
E-mail: weipingpu@gmail.com
Tel: +886-6-2757575 ext.54360
Fax:+886-4-25651078

INTRODUCTION

The modern businesses are established on the basis of marketing orientation. In today’s competitive business environments, enterprises constantly look for new models to meet customer demand. This forces back-end suppliers to make changes to react to market trend (Birjandi et al., 2013). Today, the already-made products can no longer satisfy customers. Instead, the focus is shifting to the level of self-actualization. The desire to have individualized and unique products is increasing as customers want customized products to express their individuality. For the Millennial Generation, the meaning and value of the customized product is not the product itself but the customer participation. Moreover, the concept of customization that consumers seek involves more than merely following customer requirements. Customers want to be creative and do it by themselves (Flynn and Vencat, 2012). Generally, people have special feelings for products in which they invest more time and energy. This value is not provided by unilaterally by the supplier but stems from the co-creation between customers and enterprises.

Inviting customers to join production processes is not a new idea. Alvin Toffler’s 1980 book The Third Wave predicted that would happen. It is now a commonplace. Products from dolls to computers may now be individualized and personalized in the production process. For example, Audi introduced the Audi Exclusive customized service, with more than 30,000 kinds of car color choices for interior contents such as car plaques, seat belts, or floor mats. In 2007, the total orders of Audi Exclusive per month reached £100,000 in the UK market. Nike also constructed a website, NikeID, to provide a service that allows customers to personalize their own shoes, generating over 100 million USD in 2010. According to the “Internet Retailer’s Top 500 Guide”, more than 50% of online retailers applied customization as a marketing or sales skill to help their business in 2012. The growing maturity of technology for mass customization and the internet are key drivers of the growing customization trend. In this study, Researchers refer to the processes under which customers participate in production and create their own unique product and shopping experience as “customer co-design”.

Customer co-design not only provides enterprises with...
more opportunities to understand customer demand, but also increase people’s willingness to pay (Piller and Müller, 2004). When people put labor, time, and creativity into customer co-design, it can increase their valuation of the end product (Norton et al, 2012). However, firms must overcome several issues. In addition to possessing mass customization technology, the customer must be made to feel comfortable and interested in customer co-design. Since some customers worry about their ability to complete design tasks, when enterprises provide too many choices, it creates confusion (Piller, 2004; Piller et al, 2005). Piller (2004) observed that products that are co-designed by customers may also provide symbolic benefits which come from the process of co-design (Reichwald et al, 2005).

An important precondition of co-design is that the customer must be endowed with the capability of performing the design-related tasks. This competency issue involves a flow experience. Flow experience is often applied in the research of computer users and environment related issues (Ghani and Deshpande, 1994; Hoffman and Novak, 1996; Koufaris, 2002). Flow is a state of consciousness that is sometimes experienced by individuals who are deeply involved in an activity they are enjoying. Nantel et al (2002) found that flow construct positively influences the hedonic value of customer online shopping experience. Chen (2006) has argued that the most World-Wide Web users experience positive moods while online. Scholars who study co-design related issues also suggest the further research should focus on the empirical examination of flow experience (Piller, 2004; Piller et al, 2005). Yet such studies are scarce.

In the other hand, the co-design strategy be applied on practices are very common in fashion industries. For example, some companies such as Fashionphates, Zazzle, Cafepress, and Spreadshirt provide the service online to allow customer design clothes by them. All these companies reported high double-digit sales growth in the recent year. However, the studies focus on this field still rare.

With this in mind, this study argues that the relationship between customer co-design, flow experience, and customer behavior online needed to be explored. This research has two primary objectives: (1) to investigate the relationship between customer co-design, customer satisfaction and purchase intention and (2) to test the relationship between flow experience, customer satisfaction and purchase intention. The remainder of this study is structured as follows. First, the literature background is discussed. The research setting and methodology are then described. Next, the analyses and results are presented. Finally, conclusions are drawn, together with limitations and suggestions for future research.

**Literature review and Hypotheses**

**Customer co-design, customer satisfaction and purchase intention**

Bateson (1985) asserted that customers might have the propensity to choose the “do-it-themselves” approach across many services, even when the service might be more expensive or less convenient than traditional services. In recent studies, customers play an active role in customer co-design based on mass customization. They should not be viewed as just passive receptacles, but as a source of productivity gain (Fitzsimmons, 1985; Lovebck & Young, 1979).

Scholars have advocated developing different interfaces and web-based paths for co-design (Randall, Terwiesch and Ulrich et al., 2005; Silveira et al., 2001). For enterprises, the customer-firm interaction is conducive to creating product value and customer relationship development (Miceli et al., 2007), and knowledge-sharing between the customer and the company will also lead a competitive advantage for the company (Bhatti et al., 2014). It also helps to generate creativity and innovation, as well as evaluate products and obtaining customer feedback (Rowley et al., 2007; Piller et al., 2005; Ulrich et., 2003).

Bagozzi and Dholakia (1999) argued that when interacting with e-commerce sites, goal-oriented customers focus on the transaction and tend to reduce elude social contacts. By contrast, experiential users are committed to the experience and fun and search for new stimuli independently from specific aims. Ghose and Dou (1998) also indicate that the higher interactivity level a webpage offers, the more attractive it is.

Several studies have shown that customer co-design of apparel allows customers to feel more comfortable with the final product if they found it easier to design (Ulrich et al., 2003). Scholars have found that matching customer requirements and co-creating products through web-based interaction (Prahalad and Ramaswamy, 2004; Thomke and von Hippel, 2002) broadens differentiation opportunities as well as profitability for online users (Miceli et al, 2007).

When customers participate in co-design to create something of their own, they may perceive that the product has additional value (Franke and Piller, 2004). The value might not only come from the product’s symbolic benefits, but may also be generated in the process (Piller, 2004). When people imbue products with their own time and effort, the products have special meanings for them (Norton et al, 2012). Anwar, Gulzar and Anwar (2011) argued that serving customers on an individualized basis increases customer satisfaction. Franke et al (2010) showed that when the customer felt “I designed it myself” in customer co-design, the products generated a significantly higher willingness to pay. Furthermore, Flynn and Vencat (2012) found that when enterprises provided customer co-design, repurchase, sales volume, price, and customer loyalty will all increase. H1 and H2 inferred as follows:

**H1:** The greater the customer co-design, the greater the customer satisfaction.

**H2:** The greater the customer co-design, the greater the purchase intention.

**Customer satisfaction and purchase intention**

Customers’ evaluation of products or services with regard to
their needs and expectations can be evaluated by customer satisfaction (Oliver, 1980). Oliver (1991) defined customer satisfaction as how the customer evaluates a purchase decision. Customer satisfaction influences customer's previous experience and purchase behavior (Bettman, 1979; Westbrook and Oliver, 1991).

As online shopping behavior has matured, the traditional dimensions of customer satisfaction face scrutiny. Anderson and Srinivasan (2003) surveyed customer satisfaction in the virtual environment. They defined e-satisfaction as "the contentment of the customer with respect to his or her prior purchasing experience with a given electronic commerce firm" (125), and find that e-satisfaction has an impact on loyalty, but the relationship is moderated both by customer-level factors (such as convenience motivation and purchase size) and business-level factors (such as trust and perceived value).

Customer's behavior can usually be predicted by their intentions. Thus, understanding customer's purchase intention is important. Intentional measures can be more effective than behavioral measures in capturing the consumers’ mindset because customers may make purchases based on constraints instead of preferences (Day, 1969). Ajzen and Fishbein (1980) used purchase intention to predict actual behavior. Purchase intention correlate with actual behavior. Scholars have sought to forecast customer behavior. Based on the above literature review, customer satisfaction and purchase intention are the dependent variables in this study. H3 inferred as follows:

H3: The greater the customer satisfaction, the greater the purchase intention.

**Flow experience, customer satisfaction, and purchase intention**

In general, co-design activities are achieved by a toolkit which must be preset. Although the toolkit provides customers with the basic ability to complete the co-design task, a number of factors must be considered during the process of completing a co-design product with a customer. These include the customer's ability and experience with computers and interfaces and customer creativity and awareness of aesthetics. Moreover, the existence of a higher risk of error between the virtual and actual product and the longer manufacturing time may be factors that customers feel create a more complex, risky, and uncertain shopping situation (Piller et al., 2005).

When a customer perceives a higher benefit from the customized product compared to its cost, they tend to be more willing to adopt co-design (Franke and Piller, 2003). If customers think that they could better identify appropriate products than the company, their participation would empower them to perceive more behavioral control, which would result in higher evaluations of the resulting products (Godek, 2002).

As mentioned above, psychological factors play a crucial role in customer evaluations of the result of co-design. Piller (2004) reviewed studies related to mass customization and argued that customer co-design is a precondition to customer satisfaction, but customers must also have the ability to perform this task. This ability involves flow theory, which refers to the user implementation of tasks in the process, their skills, and challenges in achieving optimal balance (Novak, Hoffman and Yung, 2000). It is also often used to explain how customer satisfaction is increased by the process (Csikszentmihalyi, 1990).

In recent years, the concept of flow has been increasingly applied in studies of user online behaviors. Flow theory has been applied to explore user's intrinsic motivations, and to accompany a dynamic process. Web users' cognitive, emotional and behavioral tendencies may be driven by flow during Internet browsing (Bagozzi and Dholakia, 1999). Flow may increase the loyalty of Internet users (Choi and Kim, 2004), or may be seen as reinforcement that strengthens user intention (Shin & Kim, 2008). Users can feel a positive mood, even joy, or become highly focused and creative when flow experiences occur (Chen, 2000; Ghani, 1995; Novak and Hoffman, 1997). Chang & Wang (2008) propose that when users’ beliefs about flow experiences are salient for online communication, a greater flow experience corresponds to a greater behavioral intention to use online communication tools. Flow experiences also influence customer unplanned purchases and intention to return (Koufairs, 2002). Further, Novak et al. (2000) argued that greater interaction with computers will generate improved flow and provide a better shopping experience. H4 and H5 inferred as follows:

H4: The greater the flow experience, the greater the customer satisfaction.

H5: The greater the flow experience, the greater the purchase intention.

**METHODOLOGY**

**Research setting and data collection**

Researchers collected the data for the empirical analysis from an online questionnaire. In this study, in order to enhance the customer motivation, the participants were asked to imagine that they purchasing a t-shirt as a gift for family member or friend.

Researchers created a website for the study that allows participants to design and purchase t-shirts by themselves. Participants were lead to the website, where researchers provided ten patterns as design items for participants to complete their work. The website also provided other functions such as choosing patterns, combining different patterns, enlarging, shrinking, and rotating patterns, as well as choosing a location for the pattern. There was no time limit for the design process, but all IP addresses were recorded to eliminate the same participant repeating the experiment.

According to the surveys on Internet usage in Taiwan, the over 60% online shoppers are female and aged between 25 ~ 34 years old (MIC, 2013). Moreover, market research has
also indicted the female heavy user of online shopping are more than male. Most of these female online shoppers are white-collar worker, aged between 25 ~ 39 years old in Taiwan (E-ICP, 2013). After participants completed the t-shirt design, they were asked to fill out the questionnaire online. After data collection, researchers received 137 usable responses. The demographic analyses of the sample showed that the most of the sample was female (67.2%), and aged were between 20-29 years old (78.8%).

Guadagnoli and Velicer (1988) review several studies that conclude that absolute minimum sample sizes. They suggested that a minimum subject to item ratio of at least 5:1. Rummel (1970) recommend the ratio should be 4:1. In this research, measures of total items were 16, reasonable number of samples should be more than 80, and researchers received 137 usable responses.

### Measures

All the constructs were measured using multi-item perceptual scales and consisted of five-point Likert-type scales ranging from 1 = "strongly disagree" to 5 = "strongly agree".

**Customer co-design.** Researchers modified the scales of Fiore et al. (2001) and Ulrich et al. (2003) to assess customer co-design, which was measured by five items ("I am willing to have co-design behaviors", "I am willing to spend more time on co-design", "I find it is easy to make design decisions", "I am comfortable with the co-design processes", "I am interested in the design scenarios").

**Flow Experience.** Following the scales of Hoffman and Novak (1996) and Chang and Wang (2008), flow experience was measured by five items ("I feel this is a challenging task to design the t-shirt", "I feel enjoyment when I design the t-shirt", "I focus when I design the t-shirt", "I feel I can’t stop designing the t-shirt").

**Customer satisfaction.** For the measurement of experienced satisfaction researchers modified three items from Anderson and Srinivasan (2003) and Bai, Law and Wen (2008). Customer satisfaction was measured by three items ("I am satisfied with my decision to design the t-shirt by myself", "if I had to design the t-shirt by myself again, I still feel it is special", "my choice to design the t-shirt by myself was a wise one").

**Purchase Intention.** Bai et al. (2008). Purchase intention was measured via three items ("I would like to by the t-shirt designed by myself", "I would like to buy the t-shirt designed by myself within the next six months" "I would like to buy the t-shirt designed by myself within the next two years").

### ANALYSIS AND RESULTS

The descriptive statistics and correlation matrix are shown in Table 1. Researchers conducted a two-stage procedure as recommended by Anderson and Gerbing (1988) in testing the proposed framework. In the first stage, confirmatory factor analysis (CFA) was conducted to evaluate the validity of the measures using LISREL 8.51. Then, a structural equation model (SEM) analysis was employed to investigate the hypothesized structural relationships.

#### Measurement validation

Cronbach’s α coefficients can be calculated to test the internal consistency reliabilities for each construct. Cronbach’s α coefficients in this study ranged from .72 to .96, indicating satisfactory levels of internal consistency. Convergent validity was examined using CFA, as recommended by Anderson and Gerbing (1988). The standardized factor loadings ranged from .66 to .97 and were statistically significant (p < .05) on their respective constructs with fit statistics indicating an appropriate fit (χ² = 126.45, d.f. = 96, comparative fit index (CFI) = .98, goodness of fit index (GFI) = .90, parsimony goodness of fit index (PGFI) = .63, nonnormed fit index (NNFI) = .98, root mean square error of approximation (RMSEA) = .05, standardized root mean square residual (SRMR) = .04). We also used composite reliabilities (CR) and average variance extracted (AVE) to identify convergent validity. In addition, the CRs ranged from .87 to .92, indicating adequate levels of reliability for the constructs as well as the AVEs ranged from .66 to .79, exceeding the recommended level of .5. Hence, the measurement model exhibited an adequate level of convergent validity.

The discriminant validity was examined by three tests. First, we calculated confidence intervals for the estimates of the inter-construct correlations. The results showed that none of the confidence intervals for the Phi values in the measurement model included a value of 1.0. In addition, discriminant validity was established by constraining the correlation between a pair of constructs in the measurement model and setting the correlation between the two constructs equal to one. Researchers then
performed a pairwise chi-square difference test comparing an unconstrained with a constrained structural equation model. The $\Delta \chi^2$ statistics ranged from 7.59 to 16.23, showing that all pairs of constructs were statistically significant. Lastly, the AVEs of the constructs were greater than the square of the correlation between any pair of constructs (greatest square of correlation was .62). These results indicate that discriminant validity was confirmed. Therefore, discriminant validity was achieved.

### Hypotheses testing

The model in this study is estimated by SEM analysis. In assessing overall model fit, the goodness-of-fit indices indicated a good fit of the model with the data ($\chi^2 = 139.38$, df. = 96, NFI = .94, NNFI = .98, GFI = .89, PGFI = .63, CFI = .98, RMSEA = .06, SRMR = .04). The structural results are shown in Figure 1.

Inspection of the standardized parameter estimates showed that $H_1$ (Customer co-design→Customer satisfaction) ($\gamma_{11} = .21$, $t = 2.94$) was largely supported at the 0.01 level. $H_2$ hypothesized a positive relationship between customer co-design and purchase intention, and was not supported by ($\gamma_{21} = .15$, $t = 1.50$). As predicted by $H_3$, the findings showed customer satisfaction appeared to positively influence purchase intention ($\beta_{21} = .60$, $t = 2.60$), supporting $H_3$. These results suggest a full mediation model, which provided significant statistical relationships for the direct effect of customer co-design on purchase intention via customer satisfaction. $H_4$ hypothesized a positive relationship between flow experience and customer satisfaction, and was supported ($\gamma_{12} = .77$, $t = 7.34$). $H_5$ hypothesized a positive relationship between flow experience and purchase intention, but was not supported ($\gamma_{22} = .19$, $t = .88$). These results suggest a full mediation model that showed a significant direct effect of flow experience on purchase intention via customer satisfaction.

### CONCLUSION AND DISCUSSION

Most early mass customization research discussed how it helps enterprises maintain management strategy in line with production or technology. Customer co-design is a growing trend and recent studies have tackled the issue of customization (Chang and Chen, 2009; Franke et al, 2010; Norton et al., 2011). However, studies from the customer point of view are lacking (Piller, 2004; Piller et al, 2005). This research based on this viewpoint attempt to have a better understanding of this phenomenon.

Drawing on the literature of mass customization, customer co-design and flow experience, the study proposed a conceptual framework and conducted an empirical study of 137 online user responses to test the hypotheses. Our results show that both customer co-design and flow experience are strongly associated with greater customer satisfaction, and customer satisfaction strongly influences greater purchase intention online. The results are consistent with the idea that co-design has a direct positive impact on customer satisfaction (Chang et al, 2009). Scholars have proposed customer co-design results greater purchase behavior, more premium (Norton et al, 2012) and higher.
willingness to pay (Franke et al, 2010).

In addition, the results confirm that strong flow experience have a positive influence on customer satisfaction. Flow research indicates that when people in flow; they become absorbed in their activity and get enjoyment (Ghani and Deshpande (1994). Koufaris(2002) indicated that enjoyment of the shopping experience is important for customers’ intention to return. Thus, when customer enjoys shopping online, it leads more satisfaction and makes them return. Researchers can explain this using the concept by experience economy, where customization is not a goal but a way to create unique value for customers and greater profit for the enterprise. Base on Franke et al (2010) research, there is no doubt, people prefer the stuff which created by themselves when they realized “I designed it myself”.

Another important finding is our verification that strong customer satisfaction mediates the effects of both customer co-design and flow experience on purchase intention. Our results show that the establishment of customer satisfaction during customer co-design process is a key success factor: In Norton et al (2012) research, they argued that labor leads to increased valuation, however, this phenomenon only happened when labor results in successful completion of tasks. If participants fail to complete the task or built and then destroyed their creation, the effect dissipated.

With regard to theoretical implications, the research clarifies the relationship among customer co-design, flow experience, customer satisfaction and purchase intention. The study has found that direct relationship among customer co-design, flow experience and customer satisfaction, and the relationship between customer satisfaction and purchase intention. We once again highlighted the importance of psychological factors on online shopping. If firms create a pleasant co-design process, it leads positive results. And more important, this research indicate that customer satisfaction plays a role as mediator in this framework. For managers, the research offer several insights for customer co-design firms. First, this research shows that to create a flow experience conduce the greater customer satisfaction and purchase intention. To make online user enjoy the creating process is necessary. Second, even though people prefer the stuff which made by them, however, if customer do not satisfied with the outcome, the effect does not exist anymore.

LIMITATIONS AND FUTURE RESEARCH

There are several limitations to this study. First, this study used the process of designing a t-shirt as stimulus. Customer involvement and knowledge may be lower than for other products such as computers or cameras. Therefore, future research is encouraged to replicate this study in other product categories. Second, this study focuses on the relation between customer co-design, flow experience, customer satisfaction, and purchase intention. However, people who like co-designing products enjoy not only the product itself but also the process of design. Thus, the cognitive value is exceeds the physical value (Franke et al, 2010; Hwang and Kim, 2007; Norton et al, 2012). This indicates the necessity of discussing the customer co-design issue from the cognitive view point. Furthermore, research could also examine how self-serving bias effect on co-design satisfaction and purchase intention. Self-serving bias refers to people’s tendency to accept more credit for success and less responsibility for failure in a jointly produced outcome (Wolosin, Sherman and Till 1973). The customer co-design behavior might be highly related with self-serving bias. Hence, these interesting areas for future research are the issue of the co-design interface and its effects.

REFERENCES

Bettman JR (1979), Memory factors in consumer choice: a review. J. mark. (43) 37-53.Crossref


on hedonic and utilitarian shopping values. Consumer Research, 29(1): 483-484.