

Conference Paper

Effect of Product Enhancement Type on Replacement and Purchase Preference of Consumers

Yen Hsu

The Graduate Institute of Design Science, Tatung University, Taipei City, Taiwan, R.O.C.

Abstract

In the fiercely competitive market of information electronics, each brand constantly releases newly enhanced products. Faced with a new product, consumers often compare it with the old product; they evaluate the remaining mental book value (MBV) of the old product or assess the difference in enjoyment (DIE) between the new and old products. Regarding replacement and purchase (RAP) behaviors, various types of consumers can exhibit dissimilar behaviors and preferences. This study employs notebook computers as sample products because these products are innovative, released in product series, and form a competitive market. A questionnaire was completed by 400 participants. The RAP preference of the participants when confronted with various product enhancement types (PETs) was determined with regard to two types of self-construal and two types of self-regulation. The mediating variables were MBV and DIE of new and old products. The results are as follows: (1) The participants are more likely to exhibit RAP behaviors for products with general enhancement (GE). (2) When the PET is GE, the participants with promotion focus—a type of self-regulation—tend to exhibit RAP behaviors. (3) When the PET is focused enhancement, the participants with prevention focus tend to exhibit RAP behaviors. The study results reveal how enterprises should develop strategies for product innovation as well as how they should fix product defects. The study results also indicate that enterprises can, according to consumer types and purchasing preferences, construct appropriate marketing strategies to increase product design quality.

Keywords: information electronics, product enhancement type, self-construal, self-regulatory

1. Introduction

Information electronics are generally renewed at considerable speed. Consumers who encounter new products of all varieties often compare these new products with old products; for example, they recall the mental book value (MBV) of old products or calculate the difference in enjoyment (DIE) between old and new products (Chang, 2013).

Corresponding Author:

Yen Hsu
 erickshi@ms1.hinet.net

Received: 29 August 2018

Accepted: 18 September 2018

Published: 11 November 2018

Publishing services provided by
Knowledge E

© Yen Hsu. This article is distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use and redistribution provided that the original author and source are credited.

Selection and Peer-review under the responsibility of the ICOI-2018 Conference Committee.

 **OPEN ACCESS**

Conversely, information electronics enterprises must understand the characteristics of various types of consumers, construct appropriate marketing strategies, and conduct product development and design adequately. These tasks are not only essential to the survival and growth of an enterprise but also greatly affect the enterprise's sales. Therefore, enterprises should complete these tasks in a cautious manner (Claybaugh et al., 2015; Urban & Hauser, 1993; Wu, 2014).

Consumers' attitudes vary while they are purchasing products. According to self-construal theory, people living in the United States, Canada, and other countries of North America—where individualism is common—are encouraged to demonstrate independent self-construal (ISC). By contrast, people living in Taiwan, Japan, Korea, and other regions of East Asia are encouraged to work as a team and exhibit dependent self-construal (DSC) (Eagly & Kite, 1987; Durante et al., 2013; Babin & Griffin, 2015). A study conducted in the United States indicates that ISC has a positive effect on purchase behavior whereas DSC does not (Kacen & Lee, 2002).

New product acceptance varies depending on the type of consumer. According to self-regulatory focus theory, people with the trait of promotion focus tend to value gains and neglect risks, whereas people with prevention focus do the opposite (Crowe & Higgins, 1997; Higgins, 1997, 2000, 2005; Zhang & Shrum, 2009). In addition, consumers with different self-regulatory focuses have different new product preferences (Chang, 2013); people with promotion focus prefer innovative products whereas people with prevention focus trait prefer traditional products (Yeo & Park, 2006).

From the perspective of an enterprise wishing to develop a new product, the release of completely new products is extremely costly. Hence, enhancing the quality of existing products is a common strategy of enterprises (Crawford & Benedetto, 2014; Ulrich & Eppinger, 2012). Taking notebook computers as an example, the ThinkPad notebook computers created by IBM (the trademark right of which was acquired by Lenovo in 2005, who changed the logo) gained a reputation for high quality and durability; thus, the company gradually released the Edge series, L series, T series, X series, and multiple new series that excited the business market (Figure 1).

Continual product enhancement and innovative design can strongly affect the achievements of an enterprise (Urban & Hauser, 1993), particularly when they produce consumer electronics, which have a short product life cycle and for which the market is extremely competitive. During the process of innovative design, an enterprise must consider whether to add new attributes to their new products. If they decide not to add new attributes, they must consider whether they should enhance all the attributes of the current product or focus on only some attributes. (Claybaugh et al., 2015). When

discussing innovative product design, an enterprise must comprehend the meaning of various innovative products to consumers if they are to attract new consumers.

This study analyzes replacement and purchase (RAP) preferences associated with participants' self-construal or self-regulation when confronted with different product enhancement types (PETs). The mediating variables considered are the MBV and DIE of old and new products. This study serves as a reference for the industry and academia to conduct and examine product design and development.



Figure 1: Notebook computer products of the ThinkPad product line.

2. Literature Review

2.1. Self-construal and self-regulation types

This study analyzes consumer types on the basis of self-construal and regulatory focus.

1. Self-construal: Markus and Kitayama (1991) state that cultural background affects an individual's self-construal, indicating that people have two sides: themselves, also known as their independent self, and their existence as part of a group, which concerns how individuals place themselves within a group and is referred to as the interdependent self. Self-construal theory was developed on the basis of these two sides (Matsumoto & Juang, 2012). The independent and interdependent selves can coexist in any individual or culture. The variation in self-construction is mainly caused by different cultural backgrounds (Triandis, 1989). Although different terms have been employed by subsequent scholars to indicate

self-construction, the interpretations of these terms all refer to the concept of Markus and Kitayama (Kelly, 2012).

Eagly (1987) investigates self-construal from the perspectives of geographical region and gender. In North America, where individualism is highly valued, individuals are often encouraged to present an individual self or are rewarded when they express themselves; in eastern Asia, where collectivism is the prevailing mentality, individuals are encouraged to exhibit teamwork concerning their dependent self. In the long term, these behaviors become habitual. In addition, gender division of labor in society results in men and women playing distinctive roles. Hence, variation in behavior further affects self-constructions and causes different values in the Eastern and Western worlds (Kelly, 2012; Smith et al., 2014).

2. Regulatory focus: Regulatory focus theory claims that regulatory focus can be divided into promotion focus and prevention focus. People with promotion focus tend to concentrate on gains and pay less attention to risks, whereas those with prevention focus on avoiding loss and hence are particularly concerned about risks (Higgins, 2000). The objective of promotion focus is to pursue ideal self-regulation that matches a person's hopes and expectations. By contrast, the objective of prevention focus is to avoid a mismatch between responsibility, duty, and obligation for self-regulation.

In addition, people with promotion focus tend to seize any possible chance of success and avoid the mistake of rejecting an opportunity, implying that they are willing to take risks. People with prevention focus tend to reject any possible chance of failure and avoid the mistake of taking opportunity of failure, signifying that they tend to avoid risks (Crowe & Higgins, 1997; Higgins, 1997).

2.2. Product enhancement types

This study divides PETs into two categories. When a new product has improved overall properties compared with a current product, its improvement is considered general enhancement (GE); if the enhancement focuses on only some attributes, it is considered focused enhancement (FE) (Okada, 2006).

Take Apple Inc. as an example. The company released the first generation iPad Air in 2013 and then the second generation in 2014. What differentiated the new product was that it was heavier, had a higher calculation speed, and had more storage; all three of these qualities were based on the attributes of the previous product.

The variation in PETs is illustrated in Figure 2. This study considers a product that has only two attributes (Attribute 1 and Attribute 2). When a product is relocated in the figure from point O to point EG, Attribute 1 increases proportionally to the increase in Attribute 2; this is considered GE. The other two enhancement types focus on only one of the attributes. When the product is relocated from point O to point EF₁, it is considered FE with a focus on Attribute 1. Similarly, relocation from O to EF₂ is considered FE with a focus on Attribute 2.

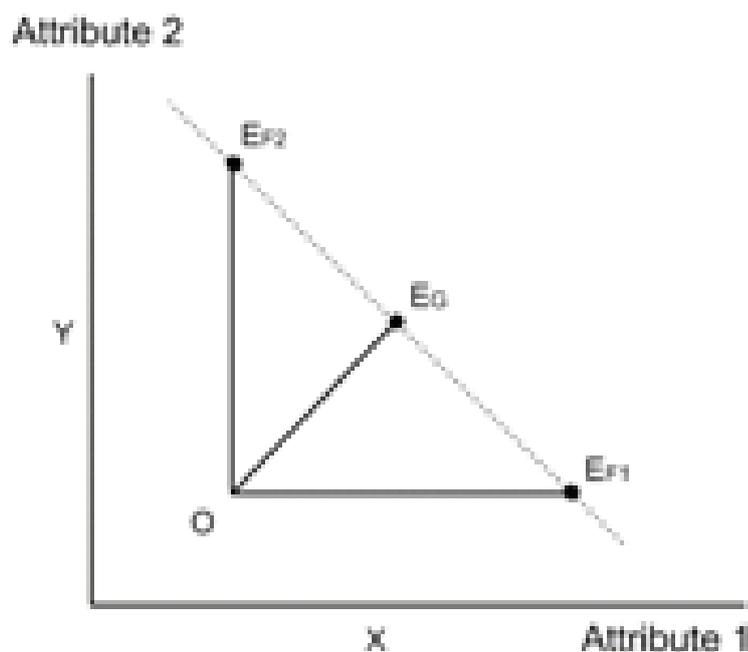


Figure 2: General enhancement and focused enhancement.

2.3. Replacement and purchase

Consumers' new product purchase decisions involve calculation of psychological costs (Thaler, 1999; Okada, 2001). When faced with new products, consumers often compare them with current products through the MBV of the current products or the DIE between the two products. Different types of consumers may prefer distinct RAP behaviors; this indicates that consumers perform RAP behaviors on the basis of the comparative advantage of the new product (Bhat et al., 1998; Okada, 2006).

The desire to replace a product is higher when consumers can acquire higher enjoyment from the favorable functions of new-generation products compared with current products. The MBV is related to the price of a product and the accumulation of enjoyment perceived from using the product. A low frequency of product usage,

low perceived quality, less accumulated enjoyment, and the MBV failing to reach the breakeven point can lead to inhibition of replacement decision (Ku et al., 2010). Furthermore, when consumers have acquired sufficient enjoyment from current products (have “got their money’s worth”), their desire to replace a product can be higher. Thus, under the conditions of low DIE between old and new products and the low MBV of the old product, consumers have a stronger desire to purchase the new product (Okada, 2001).

3. Research Method

3.1. Survey experiment

Notebook computers, which are generally innovated through product series and form a competitive market, are the products considered in this study for the following reasons. First, among all the categories of information electronics, notebook computers are the most frequently and commonly used products and also those with which consumers are more familiar. Second, information electronics enterprises release new products in series. This study refers to the research method of Gammoh et al. (2006). A survey was conducted using convenience sampling. People who visited or purchased from multiple retail stores were enlisted. The participants were informed of the survey questions and evaluated them using a 7-point Likert scale.

The independent variables in this study are self-construal, self-regulation, and PET. A three-factor between-group experimental design is adopted. The three factors are (1) two types of self-construal (ISC and DSC), (2) two types of self-regulation (promotion focus and prevention focus), and (3) two types of product enhancement (GE and FE). A factorial experiment of $2 \times 2 \times 2$ creates 8 experimental conditions in total. The mediating variables are MBV and DIE; the dependent variable is the participants’ RAP behavior.

3.2. Sampling and data collection

The survey was conducted at multiple retail stores. The experiment was explained to the participants, and only people between 19 and 45 years old were enlisted. A between-group design was adopted.

A total of 400 questionnaires were distributed (eight experimental conditions \times 50 participants). During the experiment, the designated assistant would explain the

purpose of the research, the process of the experiment, and how to complete the questionnaires. After acquiring agreement from the participants, the participants were randomly distributed to one experimental condition.

At the beginning of an experiment, the participant was asked to read the descriptions and legends of the stimuli. Subsequently, they were asked to read the descriptions of scenarios associated with self-construal, self-regulatory, and PET. The research assistant offered explanations if the participants had questions regarding the experiment.

4. Analysis and Discussion

4.1. Product enhancement type

The descriptive statistics (grand mean) of the scores for the two PETs are presented in Table I.

TABLE 1: Descriptive Statistics Discriminated by Product Enhancement Type (PET).

Product Enhancement Type (PET)	Sample	Difference in Enjoyment (DIE) M (sd)	Mental Book Value (MBV) M (sd)	Replacement and Purchase (RAP) M (sd)
General Enhancement (GE)	200	5.06 (0.97)	4.55 (1.09)	5.53 (1.11)
Focused Enhancement (FE)	200	6.01 (1.21)	6.01 (1.05)	4.23 (0.98)
Total	400	5.54 (1.09)	5.28 (1.03)	4.88 (1.07)

The stimulus objects with FE obtain higher DIE than those with GE (mean: 6.01 vs 5.06), indicating that the participants favor stimulus objects with FE. The stimulus objects with FE also possess a higher MBV compared with those with GE (mean: 6.01 vs 4.55), showing that the participants perceive the GE objects as worth less and thus do not feel they are getting their money's worth. Therefore, the participants prefer the GE type regarding RAP behavior.

4.2. Self-construal type

Under various PETs, the stimulus objects of GE and FE are discriminated by self-construal type (ISC and DSC), as illustrated in Table II. The DSC participants gave higher DIE scores toward the stimulus objects than the ISC participants (mean: 5.35 vs 4.78

and 6.06 vs 6.02), indicating that the DSC participants have greater preference for the new product stimulus objects.

TABLE 2: Descriptive Statistics Discriminated by PET and Self-Construal Type.

Product Enhancement Type (PET) x Self-Construal	Sample	Difference in Enjoyment (DIE) M (sd)	Mental Book Value (MBV) M (sd)	Replacement and Purchase (RAP) M (sd)
GE x ISC	100	4.78 (1.01)	4.14 (1.03)	6.03 (1.08)
GE x DSC	100	5.35 (0.93)	4.96 (0.98)	5.03 (1.25)
FE x ISC	100	6.02 (1.41)	6.01 (1.11)	4.35 (0.99)
FE x DSC	100	6.00 (1.02)	6.02 (0.99)	4.10 (0.96)
Total	400	5.54 (1.09)	5.28 (1.03)	4.88 (1.07)

NOTE: GE: general enhancement, FE: focused enhancement, ISC: Independent self-construal, DSC: Dependent self-construal

In addition, the DSC participants report higher MBV than do the ISC participants (mean: 4.96 vs 4.14 and 6.02 > 6.01), showing that the DSC participants perceive the stimulus objects as being worth less and thus do not feel they are getting their money’s worth.

Hence, under various PETs, the ISC participants tend to exhibit RAP behaviors.

4.3. Self-regulation

Table III presents the DIE, MBV, and RAP for the stimulus objects with different PETs (GE and FE) following the factors of self-construal (ISC and DSC) and self-regulation (promotion focus and prevention focus).

Under the condition of GE regarding PET (refer to Table 1), both ISC and DSC exhibit RAP. Under both types of self-regulation, the participants with prevention focus report a higher mean DIE (4.98 vs 4.57 and 6.11 vs 4.58) and MBV (4.21 vs 4.06 and 6.13 vs 3.79) compared with those with promotion focus, indicating that the participants with prevention focus perceive the stimulus objects as being worth less. Hence, under the condition of GE, the participants with promotion focus tend to exhibit RAP behaviors.

Under the condition of FE, the mean DIE of the DSC participants with prevention focus is higher than that of the participants with promotion focus (6.02 vs 5.95). The same result is observed when assessing MBV (6.05 vs 5.98), indicating that the participants with DSC and prevention focus perceive the stimulus objects as being worth less. By contrast, the ISC participants with promotion focus report higher mean DIE and MBV (6.09 vs 5.95 and 6.09 vs 5.93, respectively) compared with those with prevention focus. Thus, the ISC participants with prevention focus tend to perform RAP behaviors.

TABLE 3: Descriptive Statistics Regarding Each Variable.

Product Enhancement Type (PET) x Self- Construal (SC) x Self- Regulatory (SR)	Sample	Difference in Enjoyment (DIE) M (sd)	Mental Book Value (MBV) M (sd)	Replacement and Purchase (RAP) M (sd)
GE x ISC x PmF	50	4.57 (0.99)	4.06 (1.07)	6.05 (1.02)
GE x ISC x PvF	50	4.98 (1.02)	4.21 (0.98)	6.01 (1.14)
GE x DSC x PmF	50	4.58 (0.89)	3.79 (0.98)	5.94 (1.31)
GE x DSC x PvF	50	6.11 (0.97)	6.13 (1.01)	4.12 (0.99)
FE x ISC x PmF	50	6.09 (1.28)	6.09 (1.17)	4.58 (1.01)
FE x ISC x PvF	50	5.95 (1.53)	5.93 (1.04)	4.12 (0.97)
FE x DSC x PmF	50	5.98 (0.98)	5.98 (0.96)	4.05 (0.98)
FE x DSC x PvF	50	6.02 (1.05)	6.05 (1.02)	4.15 (0.94)
Total	400	5.55 (1.09)	5.28 (1.03)	4.88 (1.07)

NOTE: GE: general enhancement, FE: focused enhancement, ISC: independent self-construal, DSC: dependent self-construal, PmF: Promotion focus, PvF: Prevention focus

5. Conclusion and Suggestions

How a new product is different from an old product is the most crucial issue for consumers. When the difference between two products is larger, a consumer may sense a higher risk and learning cost or may be impressed and believe that they will receive more advantages, which results in a stronger desire to purchase the new product (Liu, 2013; Okada, 2006). Cultural background may also affect a consumer's purchase decision-making process. Related research has been conducted in Western countries for food products, but the preferences of consumers in eastern Asia and Taiwan specifically require further investigation. Referring to the research conducted by Kacen and Lee (2002), Zhang and Shrum (2009), and Higgins (1997), this study investigates the RAP behavior preferences of various consumers confronted with new products with various PETs. On the basis of psychological costs theory, this study employs the DIE and MBV toward new and old products as mediating variables. The results are as follows:

1. When the PET is GE, both ISC and DSC exhibit RAP; consumers with promotion focus tend to exhibit RAP behaviors.
2. By contrast, when the PET is FE, consumers with prevention focus tend to exhibit RAP behaviors.
3. Through the analysis based on PET, consumers prefer GE regarding RAP decisions.
4. The analysis based on the participants with various self-construal types indicates that under various PETs, individuals with ISC tend to exhibit RAP behaviors.

The results can supplement the knowledge gap regarding self-construal theory and self-regulatory focus theory in the study of marketing in Asia. Moreover, the results can serve as a reference for enterprises wishing to properly design new products and marketing strategies for increasing product design quality according to the preferences and cultural traits of consumers. The identified factors are not only essential to the survival and growth of an enterprise but also of great concern to improving marketing management (Claybaugh et al., 2015; Urban & Hauser, 1993; Wu, 2014). Therefore, the results have research value regarding product innovation in the decision-making process of enterprises.

References

- [1] Babin, B. J., & Griffin, M. (2015). Societal Influences on Schematic Processing in the Service Encounter: Directions For Study Minority Marketing: Research Perspectives for the 1990s (pp. 95-99): Springer.
- [2] Chang, S. S. (2013). Consumer choices for various types of enhanced products. *NTU management review*, 24(14), 155-172.
- [3] Claybaugh, C. C., Ramamurthy, K., & Haseman, W. D. (2015). Assimilation of enterprise technology upgrades: a factor-based study. *Enterprise Information Systems*(ahead-of-print), 1-34.
- [4] Crawford, C. M. C., & Di Benedetto, C. A. (2014). *New Products Management*: McGraw-Hill Education.
- [5] Crowe, E., & Higgins, E. T. (1997). Regulatory focus and strategic inclinations: Promotion and prevention in decision-making. *Organizational Behavior and Human Decision Processes*, 69(2), 117-132.
- [6] Durante, F., Fiske, S. T., Kervyn, N., Cuddy, A. J., Akande, A. D., Adetoun, B. E.,... Mastor, K. A. (2013). Nations' income inequality predicts ambivalence in stereotype content: How societies mind the gap. *British Journal of Social Psychology*, 52(4), 726-746.
- [7] Eagly, A. H. (1987). Reporting sex differences.
- [8] Gammoh, B. S., Voss, K. E., & Chakraborty, G. (2006). Consumer evaluation of brand alliance signals. *Psychology & Marketing*, 23(6), 465-486.
- [9] Higgins, E. T. (1997). Beyond pleasure and pain. *American psychologist*, 52(12), 1280.
- [10] Higgins, E. T. (2000). Making a good decision: value from fit. *American psychologist*, 55(11), 1217.

- [11] Higgins, E. T. (2005). Value from regulatory fit. *Current Directions in Psychological Science*, 14(4), 209-213.
- [12] Kacen, J. J., & Lee, J. A. (2002). The influence of culture on consumer impulsive buying behavior. *Journal of consumer psychology*, 12(2), 163-176.
- [13] Kelly, J. (2012). *Rethinking industrial relations: Mobilisation, collectivism and long waves*: Routledge.
- [14] Ku, H. H., Hong, M. S., & Kuo, C. C. (2010). Firm Introductory strategies of product upgrades and consumers' product replacement decisions. *NTU management review*, 21(1), 239-261. doi:10.6226/nturm2010.21.1.239
- [15] Liu, H.-H. (2013). How promotional frames affect upgrade intentions. *Journal of Economic Psychology*, 39, 237-248.
- [16] Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98(2), 224.
- [17] Matsumoto, D., & Juang, L. (2012). *Culture and psychology*: Cengage Learning.
- [18] Okada, E. M. (2001). Trade-ins, mental accounting, and product replacement decisions. *Journal of Consumer Research*, 27(4), 433-446.
- [19] Okada, E. M. (2006). Upgrades and new purchases. *Journal of Marketing*, 70(4), 92-102.
- [20] Smith, E. R., Mackie, D. M., & Claypool, H. M. (2014). *Social psychology*: Psychology Press.
- [21] Thaler, R. H. (1999). Mental accounting matters. *Journal of Behavioral decision making*, 12(3), 183-206.
- [22] Triandis, H. C. (1989). The self and social behavior in differing cultural contexts. *Psychological Review*, 96(3), 506.
- [23] Ulrich, K., & Eppinger, S. (2012). *New product design and development*: New York: McGraw-Hill.
- [24] Urban, G. L., & Hauser, J. R. (1993). *Design and marketing of new products (Vol. 2)*: Prentice Hall Englewood Cliffs, NJ.
- [25] Wu, C.-W. (2014). The study of service innovation for digiservice on loyalty. *Journal of Business Research*, 67(5), 819-824.
- [26] Yeo, J., & Park, J. (2006). Effects of parent-extension similarity and self regulatory focus on evaluations of brand extensions. *Journal of consumer psychology*, 16(3), 272-282.
- [27] Zhang, Y., & Shrum, L. (2009). The influence of self-construal on impulsive consumption. *Journal of Consumer Research*, 35(5), 838-850.