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EFFECTS OF PRODUCT-SHAPE DESIGN ON CUSTOMER REPURCHASE INTENTION

High-technology has promoted the functions of new products and great competitiveness at the market, so a lot of companies emphasize more on industrial design. When products present few differences, design is the way to enhance differences among products. For this reason, enterprises focus more on designing products in the process of product development. Apparently, design plays a critical role in promoting the value and competitiveness of products and enterprises. Having the customers of Sunfar 3C in Kaohsiung City as the research subjects, total 260 questionnaires were distributed. After deducting the 27 invalid ones, total 233 valid copies were retrieved, with the retrieval rate of 90%. Aiming at product-shape design, this study tends to discuss the effects of product-shape design and customer perceived value on customer repurchase intention. With empirical research, the promotion of product-shape design and customer repurchase intention could enhance customer perceived value, and customer perceived value presents moderating effects on the relations between product-shape design and customer repurchase intention.

Keywords: product-shape design, customer perceived value, customer repurchase intention.

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ВПЛИВ ДИЗАЙНУ УПАКОВКИ ТОВАРУ НА НАМІР ЗРОБИТИ ПОВТОРНУ ПОКУПКУ

В статті обґрунтовано, що високі технології сприяли вдосконаленню товарів і підвищенню конкурентоспроможності на ринку, тому багато компаній приділяють все більше уваги промисловому дизайну. Коли товари розрізняються мало, дизайн - ефективний спосіб виділення товару з групи аналогічних. З цієї причини підприємства приділяють більше уваги дизайну в процесі розробки продукту. Дизайн відіграє ключову роль у просуванні цінності і конкурентоспроможності продукції і підприємства. Для збору даних 260 анкет було розповсюджено серед клієнтів компанії Sunfar 3C у місті Гаосюн. Після перевірки 27 анкет визнано недійсними, було використано 233 екземпляри, рівень відгуку — 90%. У дослідженні обговорено вплив дизайну упаковки товару і сприйманої цінності на намір зробити повторну покупку. Аналіз результатів показав, що покращення дизайну упаковки і підвищення наміру зробити повторну покупку підвищують сприйману цінність товару.

Ключові слова: дизайн упаковки товару, сприймана цінність, намір зробити повторну покупку.

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ВЛИЯНИЕ ДИЗАЙНА УПАКОВКИ ТОВАРА НА НАМЕРЕНИЕ СОВЕРШИТЬ ПОВТОРНУЮ ПОКУПКУ

В статье обосновано, что высокие технологии способствовали усовершенствованию товаров и повышению конкурентоспособности на рынке, поэтому многие компании уделяют все больше внимания промышленному дизайну. Когда товары различаются мало, дизайн - эффективный способ выделения товара из группы аналогичных. По этой причине предприятия уделяют больше внимания дизайну в процессе разработки продукта. Дизайн играет ключевую роль в продвижении ценности и конкурентоспособности продукции и

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предприятия. Для сбора данных 260 анкет были распределены среди клиентов компании Sunfar 3C в городе Гаосюн. После проверки 27 анкет признаны недействительными, были использованы 233 экземпляра, уровень отклика — 90%. В исследовании обсуждено влияние дизайна упаковки товара и воспринимаемой ценности на намерение совершить повторную покупку. Анализ результатов показал, что улучшение дизайна упаковки и повышение намерения совершить повторную покупку повышают воспринимаемую ценность товара.

Ключевые слова: дизайн упаковки товара, воспринимаемая ценность, намерение совершить повторную покупку.

Introduction. Technology industry has become the key development in the era of information and technology. After industrial revolution, manufacturing has become the mainstream for products. Manufacturers in Taiwan have transformed from original equipment manufacturer (OEM) into original design manufacturer (ODM), while few of them — into original brand manufacturer (OBM). With the long-term experiences in contract manufacturing, industries in Taiwan present well-transforming bases technologically. Nevertheless, with the emergence of China market, Taiwan industries are facing enormous threats, since they follow the trend of developing high-technologies. 3C industry is the key index of the development in Taiwan. 3C is the combination of computer (information products), communication, and consumer electronics.

Traditionally, design is the experience of a designer and the decision of high-level managers at enterprises, consumers' opinions are likely to be neglected. Design projects with insufficient consumer participation could enhance some risks. In consideration of the shortening of product life cycle and the fuzziness of product differences, a lot of enterprises have regarded product-shape design as the major competitive tool. The importance of effectively transforming consumers' demands into actual products cannot be neglected. As a result, this study aims to assist decision-makers or designers in reducing the preliminary risks of new product development and enhancing the benefits with a definite and rational design principle and the requirements for appearance design.

Literature review.

I. Product-Shape Design. Products have the primary function of satisfying people's demands (Cain, 1969; Tseng, 2009). Nonetheless, a lot of possibilities could appear for products, which are judged by the instincts of designers or created by personal experiences. In a customer-oriented environment benefits are evaluated by external environment and consumers.

Product-shape design integrates functions and appearance of a product. It contributes to creating products to correspond to users improving a product with design. Chuang (2009) argued that product-shape design is a human conscious modification the nature of creating other materials beyond oneself for certain purpose.

Based on the evaluation of international designing institutes and industrial design contests, Chang (2010) classified design into psychological function, operating function, production function, and environmental function. Items covered in such functions were further divided into the objectives of beauty, popularity, innovation, pride, comfort, convenience, delivery, security, practicability, economy, and

environment. In terms of psychological function, beauty, popularity, innovation, and pride were contained in the dimensions. Referring to the dimensions proposed by Chang & Wu (2010), this study applied the following dimensions for product-shape design. 1. Form elements including the outlook, size, composition, appearance, surface treatment, detailed characteristics, and selection of materials. 2. Form image contained technology, innovation, and entirety. 3. Value covered respect, design style, personal characteristics, popular trend and features. 4. Attraction included linguistic interpretation, function orientation, and pleasure.

II. Customer Perceived Value. Lapierre (2002) regarded customer perceived value as the differences of customer perceived benefit and perceived sacrifice. Prahalad & Ramaswamy (2004) emphasized that experiences were the new basis of value and modern market value was created by interactions between customers and business. Parasuraman & Grewal (2000) proposed the dimensions of acquisition value, transaction value, utility value, and residual value for perceived value. Cheng & Li (2009) considered customer perceived value with product value, service value, and experience value. The commonly agreed perceived value is the comparison results of perceived benefit and perceived cost (Lovelock, 2001). Chang & Kao (2010) further indicated that perceived value could determine individual consumption intention. Woodruff & Gardial (1997) pointed out customer perceived value as the expected results in a specific situation perceived by customers in order to complete the desired intention or objective through the assistance of products and services.

Referring to Sweeney, Soutar & Johnson (1997), 4 dimensions were applied to the dimensions for customer perceived value. 1. Affection refers to the preference of customers who then would like to possess such products. 2. Sociality refers to social identity of owners. 3. Quality performance indicates the consistent quality. 4. Monetary value refers to a product considered favorable with such a price.

III. Customer Repurchase Intention. Customer repurchase intention is regarded as customers permanently visiting an enterprise, repeatedly or particularly purchasing and using products and services of an enterprise, and willing to introduce them to their friends or colleagues (Lovelock & Wright, 2003). Jones & Sasser (1995) considered customer repurchase intention as customers presenting dependence and favor to staff, products, or services of a company and continuous purchases of products or services. Chen (2005) defined customer repurchase intention as a favorable attitude affecting persistent repurchase behaviors of customers in a certain period of time.

Kotler (2003) definitely indicated that the cost of attracting new customers was five times the cost of maintaining present ones. Reichheld (1993) argued that not only was the cost of maintaining customers lower than acquiring new customers, but the cost of maintaining the relationship with old customers was also lower than that of maintaining new customers. Customer repurchase intention was emphasized by the academia as it tended to understand customers' demands and desire so that they could repeatedly purchase specific brands and products (Chen & Gursoy, 2001), which could further stabilize profit.

In this study, 3 dimensions proposed by Jones & Sasser (1995) were applied to measuring customer repurchase intention. 1. Intent to repurchase. Measuring customer intention of repurchasing products or services could be the key index in customers' future behavioral intention. 2. Primary behavior covered the times, frequen-

cy, amount, and quantity of purchase. Although primary behavior was an important factor in measuring actual behaviors, customers were likely to provide wrong data as they would be changed with time. 3. Secondary behavior referred to the important behaviors of customers introducing, recommending, and establishing word-of-mouth for a company.

IV. Research on Product-Shape Design, Customer Perceived Value, and Customer Repurchase Intention. Prahalad & Ramaswamy (2004) indicated that product-shape design promoted new products according to consumers' demands and customers perceived profits in or after the process and the cost of consumption; the overall evaluation was then subjectively made by the perceived value from the comparisons. When the perceived profit was larger than the perceived cost, higher customer perceived value was presented; otherwise, it demonstrated lower customer perceived value. Moreover, when customer perceived value was high, higher customer repurchase intention would be shown. Product-shape design therefore revealed significantly positive effects on customer perceived value, and customer perceived value appeared to have remarkably positive effects on customer repurchase intention (Chen & Gursoy, 2001).

Based on the above points of view, the following hypotheses were proposed in this study.

H1: Product-shape design presents notably positive effects on customer perceived value.

H2: Customer perceived value shows remarkably positive effects on customer repurchase intention.

H3: Product-shape design presents significantly positive effects on customer repurchase intention.

H4: Customer perceived value reveals moderating effects on the relations between product-shape design and customer repurchase intention.

Research method.

I. Research framework. According to the literature on product-shape design, customer repurchase intention, and customer perceived value, the research framework was further proposed for discussing the correlations between product-shape design, customer repurchase intention, and customer perceived value. The framework is shown in Figure 1.
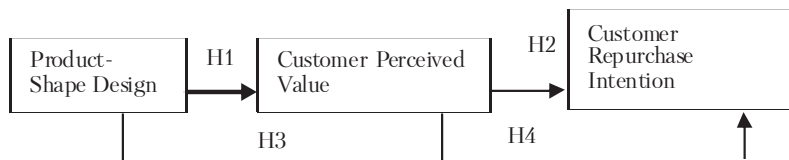

Figure 1. **Research framework**

II. Basic information on the samples. Aiming at the customers of Sunfar 3C in Kaohsiung City, including the branches of Huajung, Dream Mall I and II, Kaohsiung, Youchang, Nantze, Hsiaokang, Kangshan, Luchu, Fengshan, Wuchia, Fenglin, and Linyuan, total 260 questionnaire were distributed. Having deducting 27 invalid ones, total 233 valid copies were retrieved, with the retrieval rate of 90%.

Analysis and discussion

I. Confirmatory Factory Analysis. (1) Product-Shape Design.

The dimensions proposed by Chang & Wu (2010) were applied to measurement. With factor analysis, 4 factors were abstracted, namely form elements (eigenvalue = 3.175, $\alpha = 0.81$), form image (eigenvalue = 2.423, $\alpha = 0.86$), value (eigenvalue = 2.127, $\alpha = 0.80$), and attraction (eigenvalue = 1.344, $\alpha = 0.87$). The common variance explained achieved 83.814%, and the estimated parameters reached the statistic significance, showing the factors being suitable for explaining the dimension. Regarding the fitness of product-shape design, both GFI = 0.946 and AGFI = 0.927 were larger than 0.9, RMSR = 0.009 less than 0.05, and both CFI = 0.933 and NFI = 0.941 larger than 0.9, presenting the model being acceptable. The verification of the dimension therefore was ideally acceptable.

(2) Customer Repurchase Intention. The dimensions proposed by Jones & Sasser (1995) were utilized for measuring customer repurchase intention. With factor analysis, 3 factors were abstracted, including intention to repurchase (eigenvalue = 3.195, $\alpha = 0.85$), primary behavior (eigenvalue = 2.382, $\alpha = 0.87$), and secondary behavior (eigenvalue = 1.925, $\alpha = 0.88$). The common variance explained achieved 82.759%, and the estimated parameter reached the statistic significance, revealing the factors being suitable for explaining the dimension. In regard to the fitness of customer repurchase intention, both GFI = 0.918 and AGFI = 0.926 were larger than 0.9, RMSR = 0.017 less than 0.05, and both CFI = 0.929 and NFI = 0.937 larger than 0.9, showing the model being acceptable. The verification model of this dimension therefore was ideally acceptable.

(3) Customer Perceived Value. The dimensions proposed by Sweeney & Soutar (2001) were applied to measuring customer perceived value. With factor analysis, 4 factors were abstracted, as affection (eigenvalue = 2.774, $\alpha = 0.83$), sociality (eigenvalue = 2.243, $\alpha = 0.81$), quality performance (eigenvalue = 1.752, $\alpha = 0.89$), and monetary value (eigenvalue = 1.167, $\alpha = 0.84$). The common variance explained achieved 84.575%, and the estimated parameter reached the statistic significance, presenting the factoring being suitable for explaining the dimension. Regarding the fitness of customer perceived value, both GFI = 0.937 and AGFI = 0.942 were larger than 0.9, RMSR = 0.026 less than 0.05, and both CFI = 0.946 and NFI = 0.957 larger than 0.9, showing the model being acceptable. In other words, the verification model of this dimension was ideally acceptable.

According to the above outcomes, the overall fit of the model and the reliability and validity of the dimensions achieved the significance. With literature review and confirmatory factory analysis, linear structural model analysis was further preceded based on the factors.

II. LISREL Analysis. LISREL was used for the analyses in this study, and maximum likelihood estimation (MLE) was applied to the model. The relative matrix of the samples was regarded as the data for LISREL; the results are organized in Fig. 2.

In terms of basic fitness, 3 variables achieved the requirement $\lambda > 0.5$, so they had favorable explanations on the dimension. In regard to internal fitness, i.e. the verification of H1—H3, all of them achieved the statistical significance (0.05). Regarding the overall fitness, $\chi 2 = 76.284$ and P = 0.166 > 0.05 showed that the hypotheses could not be refused, i.e. the model did not show unfavorable fit; GFI =

0.946 exceeding the standard 0.9 presented the model being acceptable; AGFI = 0.824 close to 0.9, which should be larger than 0.8 according to Joreskog & Sorbom (1993) and Tan (2001), was acceptable; and RMSR = 0.026, which was better less than 0.05, CFI = 0.933>0.9, and NFI = 0.975, which was required to be larger than 0.9, presented the model being acceptable. In conclusion, the model was acceptable, Fig. 2.
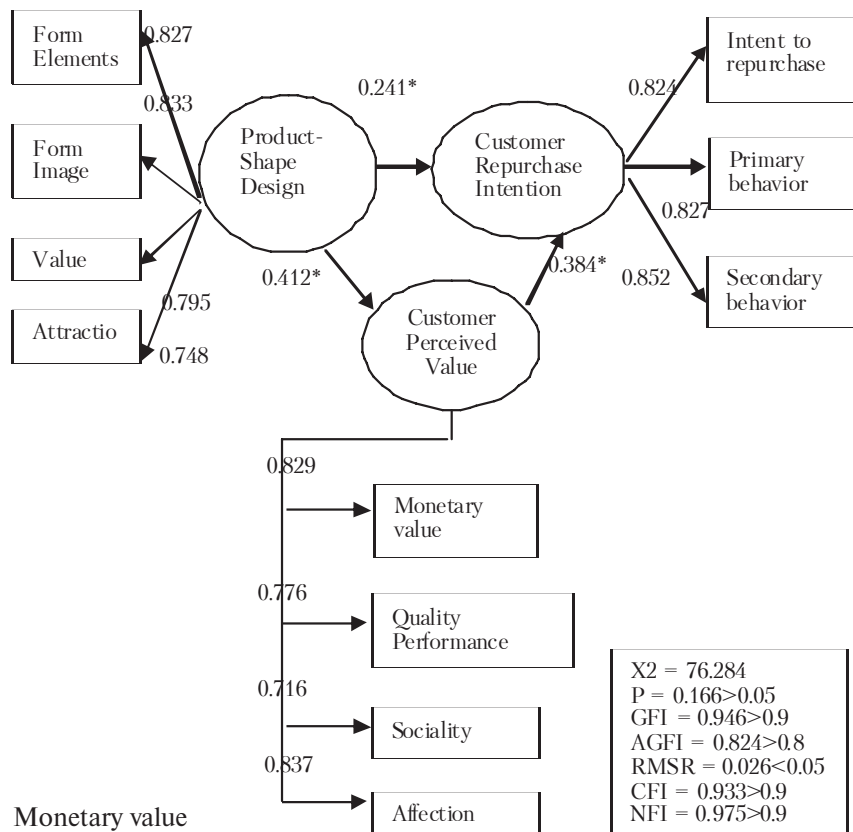

Figure 2. **LISREL Analysis**

Conclusion. Regarding the outcomes of LISREL, several opinions are proposed. First, the basic fitness could be the reference of the importance of factors under various dimensions, i.e. the critical factors in the research dimensions regarded by managers. When λ is large, the effects are high; contrarily, the factor is less important. In regard to the factors in product-shape design, form image (parameter value = 0.833) demonstrates the largest effect, showing that customers focus on product-shape design moving towards the latest technology and constant innovation. In customer repurchase intention, secondary behavior (parameter value = 0.852) presents the highest effects, showing that customers' behaviors of introducing, recommending, and establishing word-of-mouth was critical. Regarding customer perceived value, sociality (λ = 0.837) revealed the highest effects, showing the importance of social

identity for owners. A lot of enterprises therefore invest in developing individual brands and establish good word-of-mouth so as to have customers possessing social identity.

Internal fitness tends to discuss the effects between the variables. From Fig. 2, the parameter values of all the dimensions are positive, presenting the positive correlations. It reveals that the more product-shape design is shown, the higher customer perceived value is enhanced and the employees present better product-shape design to enhance customer repurchase intention, customer perceived value, and customer repurchase intention. Moreover, product-shape design shows significant correlations with customer perceived value, Fig. 2, that the parameter value $\beta = 0.412$ being the highest presents the great impact of product-shape design on customer perceived value. The result corresponds to the argument of Prahalad & Ramaswamy (2004) that both product-shape design and customer perceived value were the key factors in customer repurchase intention, and product-shape design appeared larger effects. The relation significance of H1, H2, and H3 support the hypotheses in this study; and, from the structural model, product-shape design would affect customer repurchase intention through customer perceived value. Apparently, customer perceived value is the moderator of product-shape design and customer repurchase intention, H4 supports the hypothesis in this study.

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