

A Preliminary Study on Market-Oriented Product Innovation Management Process-Using the Imagination, Design and Development of Portable Cashbox for Chinese Market as an Example

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Abstract. Product innovation management is a key loop in enterprise innovation. The present study explores the market-oriented product innovation management process using the design and development of portable cashbox for small-to-medium scaled enterprises in Chinese market. The procedure starts from the market needs which are taken into consideration and transformed into design specification for product development and concept design. After the concept design, the effectiveness in manufacturing is further considered for the prototyping to reach the goal of product development. In the case study of portable cashbox development, it is designed to be special and multi-functional for the target users in the Chinese market. A market-oriented product innovation management model is discussed and proposed.

Keywords: Product Innovation Management, Market-oriented Product Innovation, Imagination.

1. Background & Objectives

With the growing economy, China is also in part of the trend, and even grows faster and faster beyond everyone can imagine. Under this circumstance, micro-enterprises or SMEs business have developed in various ways, making cash flow and storage system in trades much more indispensable than ever. With this background, consumers in China are increasingly in pursuit of personalized and branding products, and cash flow and storage system are no exception.

The main goal of developing innovative products is to consolidate customers' loyalty and bring more revenues to the firm. Moreover, a market-oriented research can help raise the chance of product success in the market place. If designers can understand how consumers perceive products, how their needs are shaped and influenced as well as how they make choices, they can avoid working on a new product that has a low probability of success in the first instance (Rochford,1991).Yoo & Donthu (2001) argued that the development of innovative products can attract consumers' purchase intention and generate their branding experiences to build their satisfaction and trust into the brand equity. Hence, if the firms want to build brand differentiation among others, they must concentrate on finding out the experiencing design to shape consumers' experiences via design. Taking Shyh Ru Metal Company as the example, the study analyzed the operation modes of innovative product design to develop corporate brand, and achieved the following objectives:

- To explore a market-oriented new product innovation model by case study,
- To clarify the key elements in product innovation management process,
- To offer suggestions for the practical operation in new product design and development.

2. The Market-oriented Product Innovation Management Model

This research selected Shyh Ru Metal Company as the case study to analyze its innovative product design of the portable cashbox. Shyh Ru Metal Company authorized National United University in Taiwan

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and Gixia Group to design an innovative portable cashbox, which will be exhibited in a gift show in Taipei in March 2013.

The process of innovation and product development is summarized into the market-oriented product innovation management model, and achieved three objectives of this study. The course can be simply shown as follows:

- Develop the management model of innovative portable cashbox product based upon the needs of the cashiers in the micro-enterprises or SMEs business in Chinese Market.
- From the view of market demand, the design team conducted the concept product design and finished the concept product based on the target consumers. Afterwards, we put the manufacturing efficiency into consideration to complete the development of the prototype.
- Through innovative portable cashbox products, this study made effort to fulfill the consumer needs in the Chinese market.

3. Result and Analysis

3.1. Define the Target Market and Their Demands

In this study, the target user group of the innovative product development of cashbox can be defined by three parts (Fig 1):

- Main Target Market Ages: 25-39 years old
- Second Target Market: 40-49 years old
- Quasi Target Market: 20-24 years old

According to the consumer age, the largest customer segment is at the range of 25-39 years old that have the strongest economic capacity.

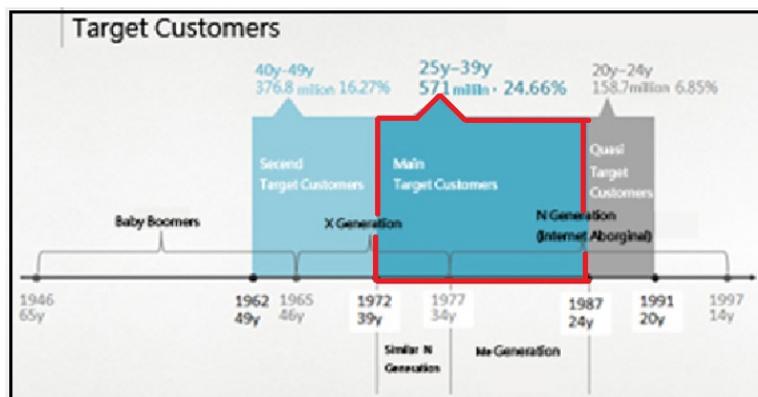


Fig. 1: The target user group for the portable cashbox.

3.2. Major Target User Group

The major target user group for the portable portable cashbox, according to the survey of isurvey (2010) have the following characteristics. The cashier job needs fresh workers just graduated from college to accumulate their work experience. They are usually single, DINK (double incomes and no kids), coming from small family and living in an apartment or may have bought the first house in their life time. From the view of the customer's behavior model, they are consumers in the second generation – the Me Generation. They are special and will cross-check when the outer information is doubtful and they care about what they buy and what they eat.

Such a consumer generation expects an enterprise can clearly express their brand values, commitment in communication, unique experience so that they can be persuaded to purchase products from the enterprise. They are different from other generations in interacting with product or service brands. For example, they will choose brands according to their egoism. If the product can touch their hearts, they will pay for it in the shortest period of time. Their purchasing behavior is often dependent on their tastes. They don't follow the regular routine and ask for something new, exciting, and fun. Least but not last, they will often gather with

other people to scrutinize whether the product hold the right and just value or not. In short, three criteria were obtained from the above analysis of the target user group: innovation, personal style, and fun

3.3. Concept Design

Through case study method and observation, Shyh Ru Metallic Industrial Corp is used as the platform for the design and development of portable cashbox. To work out a suitable product, a cooperation team was established, including Shyh Ru Metallic Industrial Corp, National United University and GIXIA Group. The key points of the meetings were recorded and analyzed for the design and development procedure from concept design to prototype to mass production. The client’s demands as well as the design and development at GIXIA Group were listed and discussed as follows:

3.3.1. Client’s Demand – Demands of New Cashbox from Shyh Ru Corp

From a series of meetings, the demand for personalization and functionality of an innovative cashbox is determined. Such innovative products should meet the requirements of users in mainland China. In terms of the product features, they should be of high quality in design, reflecting new edge of material technology, and meet the ergonomics requirements. As a result, the target user group is set to be the cashiers in micro-enterprises or SME business.

3.3.2. Innovative Product Development Process Of The GIXIA Group Design Department Design

To work out the special portable cashbox, GIXIA Group adopted the following steps in the design and development of the product, including concept design, rendering, mockup, and prototype.

The concept drawing for the portable cashbox can be seen in Fig 2 and Fig 3 illustrates the rendering for the portable cashbox.

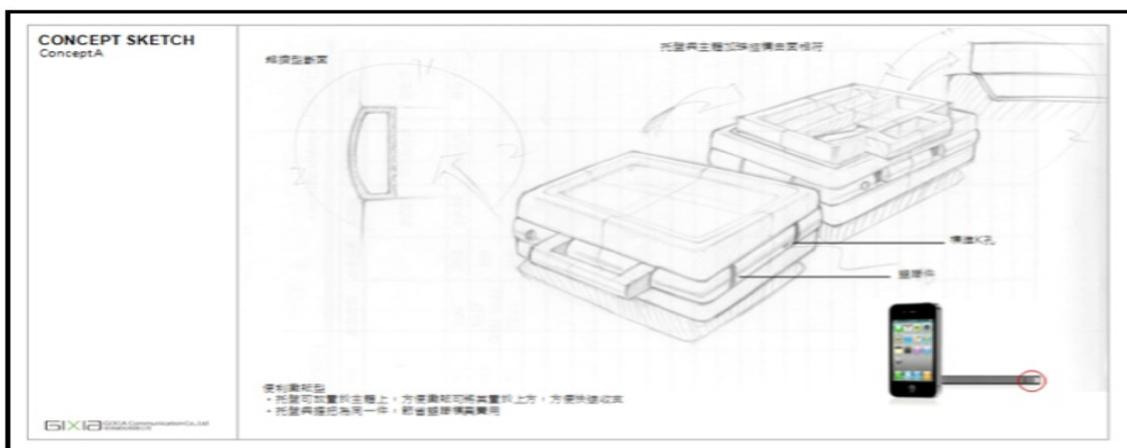


Fig. 2: The concept drawing for the portable cashbox.



Fig. 3: The rendering for the portable cashbox.

3.3.3. Mock Up Making

Fig. 4 illustrates the mock up of portable cashbox specially designed for cashiers at Mainland China. In terms of material, the case is made of ABS and the inner plate of foam, which indicate a combination of soft and hard plastic materials. Balls of different sizes represent the coins of different values. The mockup is used for the evaluation of the product form and mechanic components.

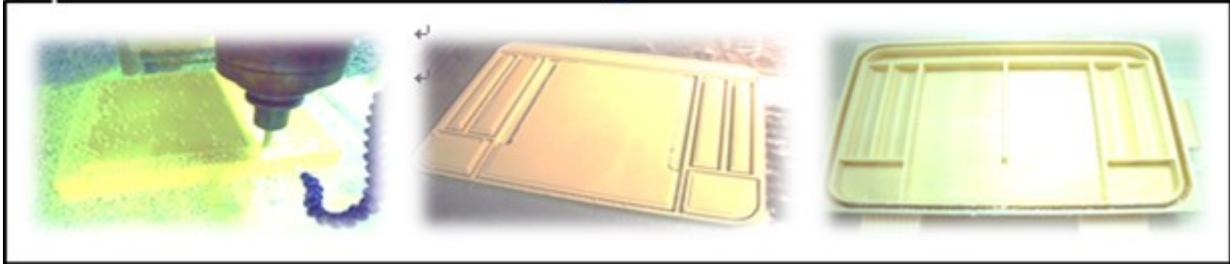


Fig. 4: The mockup for the portable cashbox.

3.3.4. The Prototyping of the Portable Cashbox

The prototyping of the portable cashbox is shown in Fig 5. Problems such as appropriateness of material and the tightness between outer case and inner plate were examined and solved. In Fig 6, different views of the prototype of portable cashbox are shown. For the sake of security, endurance, and strength, the design team determined EPP material with a metallic surface for the outer case. Furthermore, the inner plate can be removed for the cashier to check the amount of money they need to hand over to the cashier in charge of the booking account. Instead of carrying the whole set of cashbox, the cashier can only take the inner plate for the double check task. The top of the inner plate made of EPP can make this task easier.

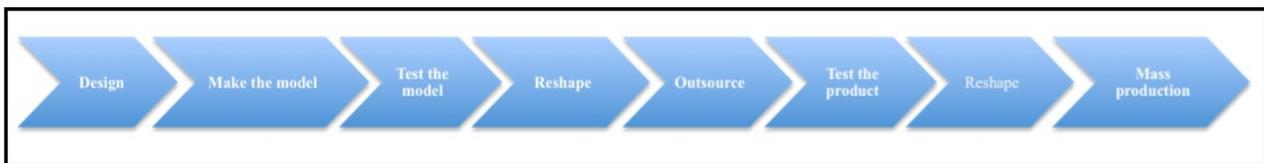


Fig. 5: The procedure for prototyping portable cashbox.



Fig. 6: The prototype of portable cashbox.

From the project, many problems occurred. It is due to the fact that the client is limited in R&D because they are majorly an OEM-oriented enterprise. They are not strong in totally new product design and development. More importantly, they lack the prototyping ability for new products. On the other hand, the design company is only good at concept design. They are not equipped with the ability of mass production. Two problems are found:

- It is difficult to transform from the concept design to engineering drawings, including the determination and marks of dimensions. This causes the team to revise the engineering drawings over and over again, resulting in the continuous extension of the cash box proofing schedule.
- In terms of product innovation, there exist big differences between Shyh Ru Metallic Industrial Corp and GIXIA Group, leading to a remarkable gap in the deployment of the new product.

From conceptual design to mass production, prototype production (proofing) and manufacturing engineering planning are two key factors to connect the client and the design company. It is evident that a good communication between the client and the design company will guarantee the success of the design and development of new product. On the contrary, the bad communication will cause the failure of the design and development of new product.

4. Conclusions

In this study, a market-oriented product innovation management mode is explored. From the case study, the following findings are obtained:

- To understand the needs of the target consumer, companies have to adequately search and analyze the social and cultural characteristics of consumer's behavior to meet their requirements. Because the economic activity in China is getting active, more demands should be required. In other words, in addition to the physiological needs, they need the to safety requirements. Some consumers are in pursuit of love and being loved, and the product styles.
- Firms must consider the common characteristics of the industry and the enterprise core competence so that a prototype that can be manufactured when treating suitability for the needs into product design as a criteria for the development of the concept product.
- In the consideration of manufacturing efficiency, how to take advantage of production and value chain system of the enterprise and related industry, as well as the power of industry clusters, are the key points of mass production.
- The product with characteristic of specialization and differentiation doesn't just rely on its design development, but also depend on its follow-up services system, so that it can create a complete customer experience and become a corporate brand.

5. Acknowledgement

The authors would like to thank the National Science Council and the Ministry of Economic Affairs of the Republic of China, Taiwan for research resources supporting this research under Contract No. NSC100-2511-S-224-005-MY2 & 99-EC-17-A-29-S1- 0145. And we also thank Shyh Ru Metallic Industrial Corp. and the GIXIA Group. Last but not least, thanks for their support.

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