

# Investigating Product Competitiveness: the Comparative Study on Consumers' Evaluation of Design Award-Winning Products between Chinese Brands and International Leading Brands

Cheng, Peiyao<sup>\*a</sup>; De Bont, Cees<sup>b</sup>

<sup>a</sup> Design Department, Faculty of Social Science, Harbin Institute of Technology (Shenzhen), Shenzhen, Guangdong, P.R. China.

<sup>b</sup> Design School, Loughborough University, Loughborough, Leicestershire, UK.

\* chengpeiyao@hit.edu.cn

Design can contribute to product competitiveness, which further boosts firms' competitiveness. Design can improve the competitiveness of products in different ways, such as creating differentiating appearances to draw consumers' attention in cluttered markets, offering more usable and superior product features and more enjoyable product experience, and proposing a new meaning to a product. China is in the middle of the transition. Chinese firms endeavour to upgrade the value chain to improve the competitiveness of developed products. With evidence on the extensive efforts of Chinese firms paid on design, this study aims to investigate the competitiveness of products developed by Chinese firms. Specifically, based on the innovation pyramid framework (Rampino, 2011), this study examines consumers' evaluation of design award-winning products in terms of overall evaluation, aesthetic innovation, usage innovation, meaning innovation, and typological innovation. Moreover, as consumers' evaluation is influenced by contextual factors, such as country-of-origin effect and prior experience, we conducted comparative study through inviting consumers from China and Netherlands to evaluate products from Chinese firms and international leading brands. Results showed that Chinese consumers evaluate Chinese products more positively than international leading brands in terms of overall evaluation, usage innovation, meaning innovation, aesthetic innovation, and typological innovation. Differently, Dutch consumers evaluate international leading brands more positively than Chinese brands in terms of overall evaluation and meaning innovation. However, Dutch consumers do not show significant differences between Chinese brands and international leading brands regarding usage innovation, aesthetic innovation, and typological innovation. Theoretical and practice implications are discussed.

**Keywords:** *Chinese design; innovation pyramid; product competitiveness; value of design*

## 1 Introduction

Design can contribute to product competitiveness, which further boosts firms' competitiveness (D'Ippolito, 2014; Hertenstein, Platt, & Veryzer, 2005; Roy & Riedel, 1997). Design can improve competitiveness of products in different ways, such as through creating differentiating appearances to draw consumers' attention in cluttered markets (Berkowitz, 1987; Gemser & Leenders, 2001; Person, Schoormans, Snelders, & Karjalainen, 2008), offering more usable and superior product features, providing more enjoyable product experience (Hekkert & Leder, 2008; Jordan, 2002), and proposing a new meaning to a product (Verganti, 2009).

Considering the significant contributions of design to product competitiveness, Chinese companies have paid extensive attention on design. China has been long considered a manufacturing giant with a focus on original equipment manufacturing (OEM) business. Chinese firms had thus gained low-profit margin and lacked innovation capability to compete with international leading brands (Liu, Liu, & Zhang, 2018). However, the situation has been changing. Chinese firms endeavour to upgrade the value chain to improve the competitiveness of developed products (Liu, 2016b). The national government has also realized the urgency to improve product competitiveness and published the national policy for transforming from 'Made in China' into 'Created in China.' To achieve this transition, design has been highlighted as the key engine (Lu, 2013).

Against this background, Chinese companies have paid extensive efforts on design to improve product competitiveness. There is evidence showing that Chinese companies have started to integrate design in all the phases in new product development (NPD) process, in order to develop products with increased utility (Zhang, Hu & Kotabe, 2011). Moreover, Chinese firms have been more aware of using design to create new meaningful offerings (De Bont, 2016; De Bont & Liu, 2017; Liu & De Bont, 2017). In practice, senior managers have shown great interests in following design-related programmes, such as the Executive Master in Meaningful Innovation offered by the Hong Kong Polytechnic University and 'Lead a Creative China 2030', which is collaboratively provided by Tsinghua University and IDEO.

Considering the extensive efforts paid on design, we start to be curious of the effectiveness of using design to enhance product competitiveness. With great emphasis on how to equip Chinese firms with design capability (Heskett & Liu, 2012; Liu, 2016a), this is the time to assess the effectiveness. Specifically, in comparison to international leading brands, are the products developed by Chinese firms are competitive? If so/not, on what dimensions Chinese firms excel, or fall behind international leading brands? Answering these questions can help us outline the competitiveness of products developed by Chinese firms, which can also reveal the design capability of Chinese firms. To answer these questions, this paper will review the literature on design and competitiveness, develop the research framework, collect and analyse data, and discuss the implications.

## 2 Literature review: design and product competitiveness

Product competitiveness refers to the degree to which the firms' product offerings are perceived to have a superior fitness for use, in comparison to the competing products in the markets (Luo, 2010; Phillips, Chang, & Buzzell, 1983; Rust, Lemon, & Zeithaml, 2004). In other words, a highly competitive product should provide superior benefits for consumers, which enable the product to stand out from other competitors in the markets. Consequently, a highly competitive product can enhance consumers' evaluation and their purchase

intention. In a long term, a competitive product can facilitate consumers' repurchase intention and brand loyalty (e.g., (Boulding, Kalra, & Staelin, 1999; Keller & Lehmann, 2006; Slotegraaf & Inman, 2004).

The competitiveness of a product depends largely on the benefits of a product. Many studies have decomposed the benefits provided by a product. Having investigated the contribution of design to competitiveness in technology-driven companies, Gemser, Jacobs, and Ten Cate (2006) concluded that functionality, usability, and aesthetic are three key factors related with a firm's design awareness, which further constitute the product competitiveness. Similarly,, Gielens (2012) have investigated the competitiveness of private label brands in comparison to national brands and proposed that benefits provided by a product can be categorized into intrinsic benefits (related with performance quality), extrinsic benefits (related with product appearance and packaging), and usage benefits (related with usability). These studies have indicated that functionality, usability, and aesthetics are generally important factors for product competitiveness.

The area of design research has also decomposed the benefits of a product and extended the previous research through identifying two additional factors. Rampino (2011) analysed a group of products and concluded that relative advantages can be created through creating aesthetic innovations, usage (a.k.a, innovation of use), meaning and typological innovation. These four types of innovation correspond to the four types of benefits of a product. Specifically, aesthetic innovation concerns product recognition, which corresponds to the extrinsic benefits (Gielens, 2012). Usage innovation refers to the improvements of product functions and usability, which correspond to functionality and usability defined by Gemster et al. (2006) and intrinsic benefits labelled by Gielens (2012). Meaning innovation relates to emotional and symbolic aspects of a product. This notion extends on the previous works (Gemster et al., 2006; Gielens, 2012). As explained by Verganti (2009), consumers buy products not only for utilitarian purposes but also for the meanings encoded within products. Thus, through exploring extensively, designers can generate new meanings and encode them into products, and these encoded meanings can contribute to product competitiveness. Typological innovation concerns the deviation of a product from its category archetype. In other words, typological innovation describes the high innovativeness level, which can be triggered by aesthetic innovation, usage innovation and meaning innovation.

Although the identified four types of products are distinct from each other, they are not necessarily exclusive from each other. In fact, they differ from each other in terms of prominence. Taken together, they make a whole offering to consumers. For example, as for the competitiveness of a product, the competitiveness could come from an aesthetically pleasing appearance, easy to use interface, superior functionality, and rich meanings associated with the product at the same time. Among the different sources for competitiveness, one might be more prominent than others.

Back to this study, product competitiveness can come from different sources, such as aesthetic, usage, and meaning innovation. Therefore, in order to investigate the competitiveness of products developed by Chinese firms, we can measure the general competitiveness of products , as well as each source of product competitiveness. Specifically, a product can be analysed on these four dimensions. For example, the twin drum washing machine is a new product launched into markets by Haier, a Chinese brand (see Figure 1). This product includes two drum washers, which is highly innovative

compared to other washing machines on the markets. This innovative function is designed for users who intend to separate laundry for independent washing. This product thus involves a high degree of usage innovation. Next, because its appearance also differs from most washing machines in the markets, it also integrates aesthetic innovation. In terms of meaning innovation, this product does not change the emotional and symbolic aspects of a washing machine, thus it only integrates a low degree of meaning innovation. In terms of typological innovation, the integration of twin-drum makes this washing machine deviate from the category archetype. This washing machine thus also includes a relatively high degree of typological innovation.



Twin Drum Washer-F  
From Haier, Chinese Brand

This washing machine is designed for people who intend to separate laundry for independent washing (e.g.: adults / children, dark / light colors). This washing machine integrates the innovative balanced system. As a result, the twin drums operation noise is reduced by 20 dB compared with the existing products on the market. This washing machine uses a full touch surface. A round slide touch is located in the center and other touch options are symmetrically split and embedded with guiding operation logic, to improve the interactive experience.

Figure 1. The example of a twin drum washing machine developed by Haier

### 3 The Present Study

This study aims to investigate the competitiveness of product developed by Chinese firms. Following the innovation pyramid framework (Rampino, 2011), we are able to pin down the general competitiveness as well as the competitiveness on specific dimensions. Our research questions are proposed as follows: Are Chinese brands competitive with international leading brands? If so/not, on what dimensions do they excel/fall behind with international leading brands?

Answering these questions can make important contributions. First, few studies have been conducted to understand the competitiveness of products developed by Chinese companies. Since several studies have been conducted to investigate the integration of design in NPD process in Chinese companies (Zhang, Hu, & Kotabe, 2011) and the barriers to utilize the strategic design in Chinese companies (De Bont & Liu, 2017; Liu & De Bont, 2017), time is ripe to assess the results and quality of utilizing design in Chinese companies. Second, while Rampino (2011) proposed the innovation pyramid framework to outline design's contribution to new product development through qualitative methods, it is still to be known whether this research framework is comprehensive enough adequate to capture and explain the product competitiveness. Using this model to investigate Chinese firms' product competitiveness, we can examine the adequacy of this framework to describe product competitiveness. Third, results of this study can provide additional insights into the gap between Chinese firms and international leading brands, which can offer actionable implications for Chinese firms.

## 4 Research Design

In order to address the research questions, we collected products that won international design awards (i.e., reddot, iF) for four reasons. First, we believe that companies that developed these award-winning products appreciate the importance and value of design. Another reason for choosing awards-winning products is that these products, selected by design experts, represent the highest quality of design (Self, 2013). Investigating these products allows us to better understand the role of design encoded by companies. Furthermore, as awards-winning products have similar overall design quality, it is possible to conduct a comparable study. In addition, since we intend to compare the product competitiveness between Chinese firms and international leading brands, we collected products developed by Chinese firms and those by international leading brands.

Next, to gain insights into product competitiveness on a specific dimension, we followed Rampino's innovation pyramid framework. We characterize the award-winning products along four dimensions, each of which corresponds to the degree of involving aesthetic innovation, usage innovation, meaning innovation, and typological innovation, respectively. We examine consumer responses to products in terms of their overall evaluation of the products, as well as their evaluation on each of the four dimensions.

Moreover, consumers' evaluation of a product is largely influenced by contextual factors, such as the country-of-origin (COO) effect and consumer's prior experience (Bilkey & Nes, 1982). In general, consumers tend to evaluate products from developed countries (e.g., Germany, Japan, and U.S.) more positively than those from developing countries (e.g., Nigeria, China, and Vietnam, see Yeong, Mohamad, Ramayah, & Omar, 2007), because the former ones enjoy more positive perceptions and images (Hampton, 1977; Krishnakumar, 1974; Schooler, 1971; Tongberg, 1972; Wang, 1978). However, one exception is that consumers tend to evaluate their own country's products more positively than foreigners do (Kaynak & Cavusgil, 1983). For instance, American consumers usually evaluate U.S. products more positively, whereas European consumers evaluate European products over American products (Bannister & Saunders, 1978; Nagashima, 1977). The positive perception of local brands can be triggered by consumers' familiarity with local brands. For consumers who have prior experience with a brand, they tend to be more loyal to the brand than consumers without such prior experience (Ozer, 2011). Consumers' prior experience can be gained either directly through using or trying a product themselves, or indirectly through being exposed to various promotion activities.

Considering the COO effects, this study intends to conduct comparable study (see figure 2 for research model). To do so, we invited participants from different countries to evaluate the products of Chinese firms and those of international leading brands. Based on a comparison of consumers' evaluations of products from Chinese companies and international leading companies, we can learn the overall performance and sub-dimensional performance of Chinese companies in different markets. The results are can enrich the current understanding of the competitiveness of products developed by Chinese brands.

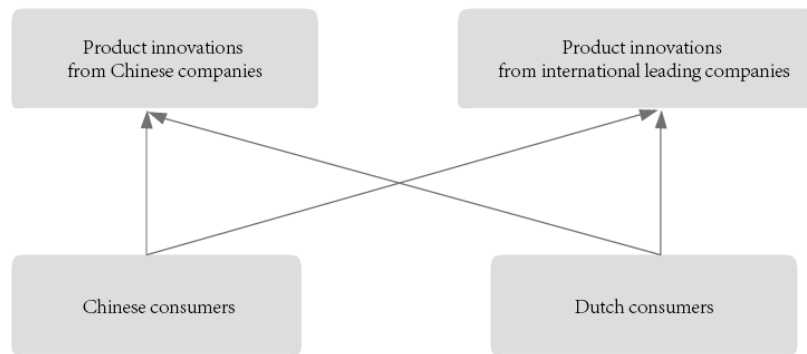


Figure 2. Research model of this study.

## 5 Methods

### 5.1 Design and participants

A survey was conducted. The survey used a 2 (product origin: Chinese brands vs. international leading brands) × 2 (consumer origin: Chinese consumers vs. non-Chinese consumers) × 4 (product category: smartphone, cleaning robot, TV, and washing machine) design, with product origin and consumer origin as between-subject factors and product category as within-subject factor.

Two hundred and sixteen participants (mean age = 36.7, 52.7% male) were invited from a consumer panel. Participants were collected from China and Netherlands. Netherlands was selected because it sharply contrasts with China for its smaller size and fewer variabilities. Dutch consumer are also more open to adopting innovations than their counterparts in other European countries (Suriñach, Autant-Bernard, Manca, Massard, & Moreno, 2009) and do not feel reluctant to purchase foreign products (Nijssen & Douglas, 2004).

### 5.2 Stimuli

Four product categories were collected to improve generalizability: smartphones, cleaning robots, TVs, and washing machines. The market penetration for these product categories is relatively high, leading to the fierce market competition. Brands thus rely on design to gain a competitive edge. Moreover, as these product categories have been mature, consumers possess basic knowledge of these products. Next, for each product category, four products were selected, totalling 16 products. Within each product category, we collected two products from Chinese brands and two products from international leading brands. For each product, the product picture(s), functional descriptions, and the product's origin country constituted stimuli presented to participants.

### 5.3 Procedure and Measurements

Each participant was assigned to rate products, which are either from Chinese brands or from international leading brands. Each participant evaluated one product from each product category, totalling four products. The order of presenting products was randomized.

The survey was conducted through online research tool Qualtrics. The survey was firstly made and tested in English. Next, the survey was translated to Chinese and Dutch respectively and distributed in these two countries. The size of sample and demographic information were balanced across the two countries.

We measured consumers' overall evaluation of products, consumers' evaluation of aesthetic innovation, usage innovation, meaning innovation, and typological innovation. The measures were based on a 7-point scale from 1 to 7 (see Table 1 for detailed measures).

*Table 1. The measures used in the study*

Overall Evaluation (Mugge & Dahl, 2013; Zhao, Hoeffler, & Dahl, 2012) $\alpha$ ranged from 0.91 to 0.93
bad/good
negative/positive
unfavorable/favorable
dislike/like
Aesthetic Innovation (adapted from Rampino 2011; Gielens 2012)
$\alpha$ ranged from 0.90 to 0.92
The product is easily recognizable.
The product introduces a new look.
The features of product are presented in a new way.
Usage Innovation (adapted from Rampino 2011; Gielens 2012; Zhao, Dahl & Hoeffler 2014)
$\alpha$ ranged from 0.92 to 0.95
The product is intuitive to use.
The product introduces new function.
The product offers new features.
What do you think of the technology integrated in the product? not novel / very novel.
Meaning Innovation (adapted from Rampino 2011) $\alpha$ ranged from 0.93 to 0.95
The product is considered a status-symbol.
The product is exciting.
The product introduces new meaning to the product category.
Typological innovation (adapted from Rampino,2011; Veryzer & Hutchinson,1998)
$r$ ranged from 0.12 to 0.21
How is the product compared with others?
- Not typical/very typical
- Not usual/very usual.

## 6 Results

The model constructs were firstly assessed by means of a confirmatory factor analysis (CFA) to examine the adequateness and accuracy of the conceptual model. Next, after the reliability and validity of measured had been confirmed, ANOVA analyses were conducted to reveal the differences between Dutch and Chinese consumers' evaluation of products.

### 6.1 Reliability and Validity of Measures/Test of the Conceptual Model

The internal consistency and convergent validity of the scales to measure consumers' evaluation of products on aesthetic, usage, meaning and typological dimension was investigated by performing a CFA on all items of the latent variables using ML-estimation in LISREL 8.80 (Jöreskog & Sörbom, 1993). The results indicated a good fit to the data ( $\chi^2 = 542.20$ ,  $df = 94$ ,  $\chi^2/df = 5.5$ ;  $GFI = 0.93$ ,  $CFI = 0.99$ ,  $RMSEA = 0.074$ ). Convergent validity was indicated by the fact that the items loaded significantly on their corresponding latent construct (all  $t$ 's  $> 2.0$ ) (Bagozzi, Yi, & Phillips, 1991). Discriminant validity among the scales was assessed as follows. First, a baseline model (in which the correlations between pairs of constructs were freely estimated) was estimated for each possible pair of scales. Next, we compared this baseline model to a series of alternative models, in which the correlations between pairs of constructs were constrained to unity (Anderson & Gerbing, 1988). In each case, the constrained model exhibited a statistically increase in chi-square ( $\Delta\chi^2 (1) > 3.84$ ), providing evidence of discriminant validity (Bagozzi & Phillips, 1982). Furthermore, the reliability of each scale was explored by computing the reliability coefficient or Pearson's

correlation ( $\alpha$  overall evaluation= 0.96;  $\alpha$  aesthetic innovation = 0.91;  $\alpha$  usage innovation = 0.95;  $\alpha$  meaning innovation = 0.94;  $r$  typological innovation = 0.208,  $p=0.002$ ). Taken together, these models present a sufficient degree of reliability and validity (see figure 3).

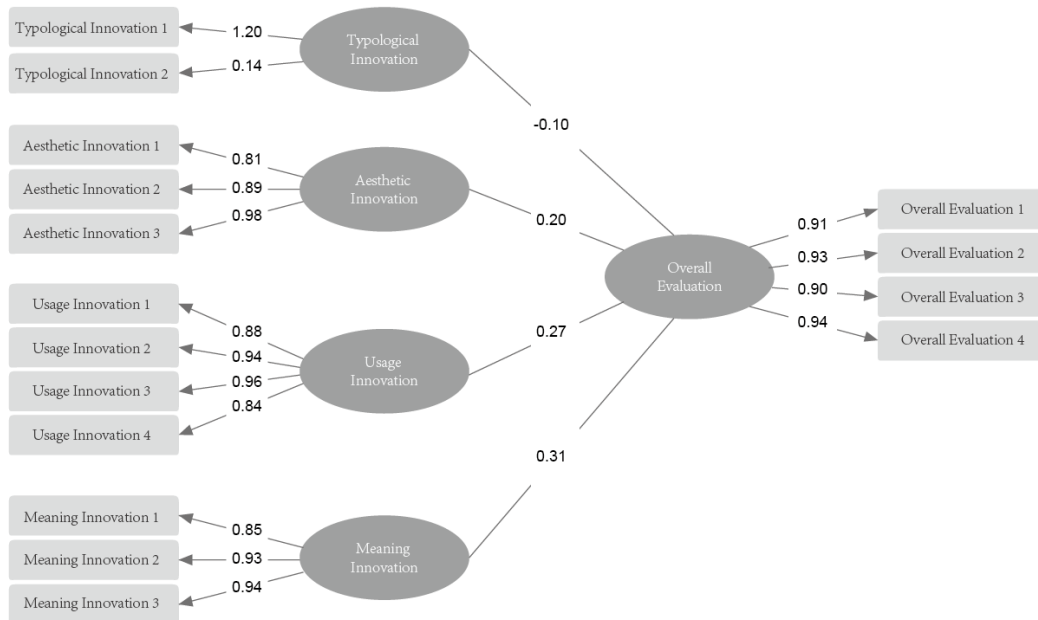


Figure 3. Results of CFA

## 6.2 Consumers' evaluation of products between different countries

Repeated measure ANOVA was conducted with product origin and consumers' origin as between subject variable, product category as within variable. Results revealed interaction effects between consumers' origin and products' origin on the ratings of overall evaluation  $F(1, 213)= 15.72, p<0.00$ , aesthetic innovation  $F(1, 213)= 8.33, p<0.01$ , usage innovation  $F(1, 213)= 7.72, p<0.01$ , meaning innovation  $F(1, 213)= 10.02, p<0.01$ , and typological innovation  $F(1, 213)= 11.58, p<0.01$ .

Specifically, for Chinese consumers, they reported higher scores for Chinese brands than international leading brands in terms of overall evaluations ( $F(1, 112)= 11.73, p<0.05$ .  $M_{\text{Chinese brand}} = 6.17$  vs.  $M_{\text{international brand}} = 5.65$ ), aesthetic innovation ( $F(1, 112)= 6.42, p<0.05$ .  $M_{\text{Chinese brand}} = 5.68$  vs.  $M_{\text{international brand}} = 5.20$ ), usage innovation ( $F(1, 112)= 8.83, p<0.05$ .  $M_{\text{Chinese brand}} = 5.87$  vs.  $M_{\text{international brand}} = 5.34$ ), meaning innovation ( $F(1, 112)= 6.50, p<0.05$ .  $M_{\text{Chinese brand}} = 5.61$  vs.  $M_{\text{international brand}} = 5.10$ ), and typological innovation ( $F(1, 112)= 9.79, p<0.05$ .  $M_{\text{Chinese brand}} = 5.17$  vs.  $M_{\text{international brand}} = 4.65$ ), suggesting that Chinese consumers generally perceived Chinese brands more positively than they did with international brands (see Figure 4).



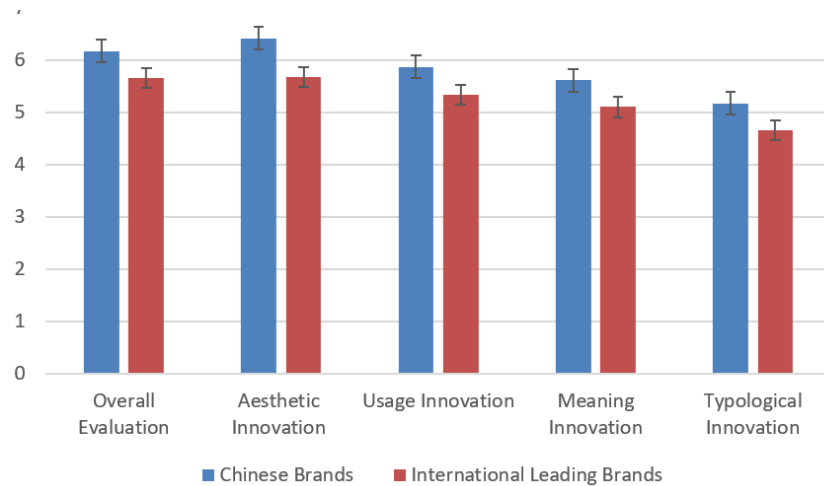


Figure 4. Chinese consumers' evaluation of products developed by Chinese brands and international leading brands.

Different results were found for Dutch consumers. Dutch consumers rated higher scores for international leading brands than Chinese brands on overall evaluation ( $F(1, 101) = 5.66, p < 0.05$ .  $M_{\text{Chinese brand}} = 4.71$  vs.  $M_{\text{international brand}} = 5.23$ ) and meaning innovation ( $F(1, 101) = 4.05, p < 0.05$ .  $M_{\text{Chinese brand}} = 3.79$  vs.  $M_{\text{international brand}} = 4.36$ ). No significant differences were found in terms of typological innovation ( $p > 0.5$ ), usage innovation ( $p > 0.1$ ) and aesthetic innovation ( $p > 0.1$ ) between Chinese brands and international brands. The results indicated that Dutch consumers perceived international brands more positively in general and meaning innovation (see Figure 5).

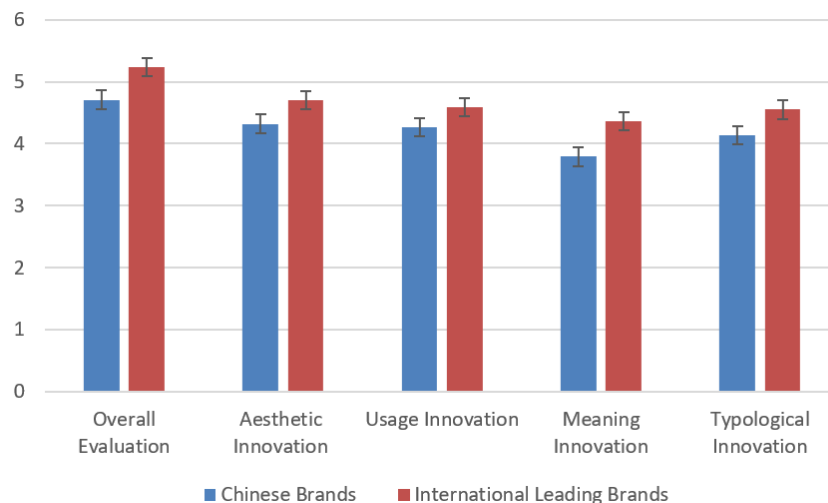


Figure 5. Dutch consumers' evaluation of products developed by Chinese brands and international leading brands.

## 7 General Discussion

This research investigated competitiveness of products developed by Chinese brands through investigating consumer responses to design awards-winning products. To capture the different sources of product competitiveness, this study follows the innovation pyramid framework (Rampino, 2011) to examine consumers' overall evaluation of products as well as evaluations on aesthetic, usage, meaning, and typological innovation. Through structural

equation modelling, the data reveal a good fit with the proposed conceptual model, which demonstrated the validity and adequacy of four sub-dimensions in innovation pyramid framework in capturing consumers' overall evaluation of products.

Furthermore, the current results reveal Chinese consumers' and Dutch consumers' different evaluations of product innovations from Chinese firms and international leading brands. Specifically, Chinese consumers evaluated Chinese products more positively than international leading brands in terms of overall evaluation, usage innovation, meaning innovation, aesthetic innovation, and typological innovation. As for Chinese brands in Chinese markets, results showed that they perform very well thus far. Chinese consumers used to have an inferior perception for local brands several decades ago (Sklair, 1994). However, our results suggest that such an inferior perception has completely disappeared. Instead, Chinese consumers showed more favourable attitudes towards local brands. It is amazing to see how fast Chinese companies have acquired the design capability in spite of many barriers, leading Chinese firms successfully convince Chinese consumers.

However, the positive impressions of Chinese consumers on Chinese brands could be attributed to COO effects, so it is necessary to understand Dutch consumers' evaluation. Different from Chinese consumers, Dutch consumers evaluated international leading brands more positively than Chinese brands in terms of overall evaluation and meaning innovation. Dutch consumers did not show significant differences between Chinese brands and international leading brands regarding usage innovation, aesthetic innovation, and typological innovation. In other words, in the Dutch market, Chinese brands competitively develop aesthetically pleasing and user-friendly products similar to international leading brands. However, it still takes efforts for Chinese brands to convince Dutch consumers of their ability to develop meaning innovation.

Taken together, these results indicate that Chinese brands are able to utilize design to improve product competitiveness. Chinese firms are demonstrated to be as competitive as international leading companies in using design to create aesthetic and usage innovation in both Chinese and Dutch markets. While Chinese brands perform very well in the domestic market in utilizing design to generate meaning innovation, they do much less so in Dutch market. Chinese firms' different performances in creating meaning innovation can be explained by the difficulty in developing meaningful innovations for foreign markets. The cultural differences pose as a major barrier to developing meaning innovations for another culture.

## **7.1 Contributions**

The current results contribute to the field in several ways. Previous studies have investigated how to stimulate strategic role of design in Chinese firms (Liu, Liu, & Zhang, 2018; Liu & De Bont, 2017; De Bont & Liu, 2017; De Bont, 2016). This study has confirmed the competitiveness of products developed by Chinese companies. The comparison between product innovations developed by Chinese companies and those by international leading brands has demonstrated Chinese brands outperform international leading brands in the Chinese market. However, in western markets, there remain stereotypes. Dutch consumers only believe in Chinese companies' ability to develop usage and aesthetic innovation but not meaning innovations. This finding suggests that Chinese brands need to further persuade consumers of their ability to develop meaning innovation if they intend to compete with international leading brands in western markets.

Additionally, this study has provided empirical basis for the validity and adequacy of four-dimension in describing different types of product innovations. Since the Rampino's (2011) innovation pyramid was originally developed based on qualitative studies, little quantitative research has utilized this framework to investigate the competitiveness of product innovations. Our results computed through SEM have demonstrated that these four-dimensional model based on the innovation pyramid can serve as effective tools in exploring the role of design as manifested in the characteristics of products.

## **7.2 Practical Implications**

Our findings have implications for Chinese brands interested in launching their products in western markets. The western markets are relatively mature, where consumers hold certain perceptions. Western consumers, as represented by the Dutch consumers in this research, are prepared to accept aesthetic and usage innovations generated by Chinese brands; however, they are yet convinced of Chinese companies' innovation at the higher level of the pyramid, namely meaning innovation and overall innovation. Chinese brands need to invest greater efforts to utilize the strategic role of design to develop meaning innovation.

To develop meaning innovation, companies need to develop a standard design-led process to lead NPD process (Heskett & Liu, 2012). In this respect, design-driven innovation strategy can be particularly helpful (Verganti, 2009). Accordingly, product development teams should explore at a greater depth the hidden and unspoken meanings in sociocultural contexts. The design-driven innovation process significantly differs from the traditional user-centred design process, which requires product development teams to be close with end-users, be sensitive to their needs, and be creative to propose solutions. The networked process demands the new product development team to work with key interpreters, share knowledge, and propose unique meanings. The interpreters include designers, architect, users, artists, etc who are interested in understanding the meanings embedded in current sociocultural context, as well as proposing meanings for future sociocultural context. Collaborating with these interpreters to explore, share, and internalize knowledge on meanings are likely to create products with desirable meanings.

Moreover, companies need to be aware of the difficulty in developing meaningful product innovations for foreign markets. The cultural context largely shapes consumers' perceptions and experience of the meaning encoded in a product innovation. What is considered meaningful in one cultural context is not necessarily so in other cultural contexts. To address this challenge, companies need to understand a distant cultural background, interpret it properly and develop meaningful product innovations accordingly. In this respect, it is helpful to deploy of cross-culture design toolkits to go beyond individual perspectives and establish a shared understanding and empathy with users in a distant cultural background (Hao, van Boeijen, Stappers, & Alberto, 2017; Postma, 2012; van Boeijen, 2015).

These findings also offer implications for international leading brands interested in Chinese markets. Chinese consumers used to believe that international brands are superior to local brands (Sklair, 1994) and many Chinese firms used to imitate western brands. Given such presumptions, international leading brands used to occupy large market shares in Chinese markets. However, with the rising of Chinese brands, the advantages of international leading brands may fade out (Laforet & Chen, 2012). Results of this research reveal that consumers do not associate superiority with international leading brands in Chinese markets. Therefore, international leading brands should consider how to compete with local brands.

### 7.3 Limitations & Future research

There are several opportunities to strengthen this research. In this study, we compared Dutch consumers' and Chinese consumers' evaluation of products from international leading brands and their evaluations of products from Chinese brands. We selected Dutch consumers to represent consumers in western countries because Netherlands is a small country with few varieties and Dutch consumers tend to be more open to adopt foreign products. However, in future research, it would be valuable to replicate this study in other countries (e.g., U.S.) to strengthen the conceptual model. Moreover, to ensure the generalizability, this study involves four product categories with high market penetration. It would be interesting to examine consumers' evaluation with product categories, which are in the early stage of product life cycle.

There are additional factors influencing product competitiveness in the markets, such as product price and manufacturing costs, but we focused only on the benefits provided by a product. Future research should consider other factors determining product competitiveness and examine product competitiveness in Chinese firms in general. Moreover, we investigated product competitiveness from consumers' perspective, it would be interesting for future research to take a firm perspective through measuring business performance, such as revenue, profit, and revenue growth (Manoochehri, 2010), which will deepen our understanding of the design's contribution to firms' financial performance.

Moreover, although this study reveal Chinese consumers' positive impression of products developed by Chinese firms, we should be aware that the selected products are awards-winning ones, which represented the highest quality but may not indicate the average design capacity of majority Chinese firms. In other words, the most SMEs may not be equipped with the similar level of design capability. Thus, we expect more research on investigating the products developed by most SMEs and understand the average design capability of Chinese firms.

Furthermore, the stimuli selected in this study are products. However, design can contribute to product development, as well as service development. In fact, Chinese Internet industry is prosperous and many Chinese firms emphasize the development of meaningful service innovation. For example, targeting UK markets, TrainPal is an App run by Chinese firms. TrainPal is developed to help consumers buy train tickets in the cheapest and fastest way. By adopting specialized algorithms, TrainPal can segment a journey into different parts and search for the most suitable solution, helping consumers save 30% of the cost. Considering TrainPal has become the most popular App in UK in 2018, researchers should consider investigating the product competitiveness and capabilities in service innovation context, to broaden our understanding of the competitiveness of design in Chinese companies.

## 8 References

- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological bulletin*, 103(3), 411.
- Bagozzi, R. P., & Phillips, L. W. (1982). Representing and testing organizational theories: A holistic construal. *Administrative science quarterly*, 459-489.
- Bagozzi, R. P., Yi, Y., & Phillips, L. W. (1991). Assessing construct validity in organizational research. *Administrative science quarterly*, 421-458.
- Bannister, J. P., & Saunders, J. A. (1978). UK consumers' attitudes towards imports: the measurement of national stereotype image. *European Journal of Marketing*, 12(8), 562-570.

- Berkowitz, M. (1987). Product shape as a design innovation strategy. . *Journal of Product Innovation Management*, 4, 274-283.
- Bilkey, W. J., & Nes, E. (1982). Country-of-origin effects on product evaluations. *Journal of international business studies*, 13(1), 89-100.
- Boulding, W., Kalra, A., & Staelin, R. (1999). The quality double whammy. . *Marketing science*, 18(4), 463–484. .
- D'Ippolito, B. (2014). The importance of design for firms' competitiveness: a review of the literature. . *Technovation*, 34, 716-730.
- De Bont, C. (2016). Lessons from China: Paradise or Graveyard for Strategic Designers. *Journal of Design, Business & Society*, 2(1), 9-22.
- De Bont, C., & Liu, S. X. (2017). Breakthrough Innovation through Design Education: Perspectives of Design-Led Innovators. *Design Issues*, 33(2), 18-30.
- Gemser, G., Jacobs, D., & Ten Cate, R. (2006). Design and competitive advantage in technology-driven sectors: The role of usability and aesthetics in Dutch IT companies. . *Technology Analysis & strategic management*, 18(5), 561-580.
- Gemser, G., & Leenders, M. A. (2001). How integrating industrial design in the product development process impacts on company performance. *Journal of Product Innovation Management*, 18(1), 28-38.
- Gielens, K. (2012). New products: The antidote to private label growth? *Journal of Marketing Research*, 49(3), 408-423.
- Hampton, G. M. (1977). Perceived Risk in Buying Products Made Abroad By American Firms. *Baylor Business Studies*, October 53-64.
- Hao, C., van Boeijen, A., Stappers, P. J., & Alberto, L. (2017). *Cultura: A communication toolkit for designers to gain empathic insights across cultural boundaries*. Paper presented at the International Association of Society of Design Research, Cincinnati.
- Hekkert, P., & Leder, H. (2008). Product aesthetics. *Product experience*, 259-285.
- Hertenstein, J. H., Platt, M. B., & Veryzer, R. W. (2005). The Impact of Industrial Design Effectiveness on Corporate Financial Performance\*. *Journal of Product Innovation Management*, 22(1), 3-21.
- Heskett, J., & Liu, X. (2012). *Models of Developing Design Capacity: Perspective from China*. . Paper presented at the International Design Management Research Conference, Boston. .
- Jöreskog, K. G., & Sörbom, D. (1993). *LISREL 8: Structural equation modeling with the SIMPLIS command language*. : Scientific Software International.
- Jordan, P. W. (2002). *Designing pleasurable products: An introduction to the new human factors*. London: Taylor & Francis.
- Kaynak, E., & Cavusgil, S. T. (1983). Consumer attitudes towards products of foreign origin: do they vary across product classes? *International Journal of Advertising*, 2(2), 147-157.
- Keller, K., & Lehmann, D. R. (2006). Brands and branding: Research findings and future priorities. . *Marketing science*, 25(6), 740-759.
- Krishnakumar, P. (1974). *An Exploratory Study of the Influence of Country of Origin on the Product Images of Persons from Selected Countries*. (Ph.D), The University of Florida.
- Laforet, S., & Chen, J. (2012). Chinese and British consumers' evaluation of Chinese and international brands and factors affecting their choice. . *Journal of World Business*, 47(1), 54-63.
- Liu, S. X. (2016a). *DesignAwareness:DevelopingDesignCapacityin ChineseManufacturingIndustry*. Paper presented at the Design Research Society 2016, Brighton, UK.
- Liu, S. X. (2016b). Innovation design: made in China 2025. . *Design Management Review*, 27(1), 52-58.
- Liu, S. X., & De Bont, C. (2017). Barriers to Strategic Design: A Perspective from China. . *She Ji: The Journal of Design, Economics, and Innovation*, 3(2), 133-145.

- Liu, S. X., Liu, H., & Zhang, Y. (2018). The new role of design in innovation: A policy perspective from China. . *The Design Journal*, 21(1), 37-58.
- Lu, Y. X. (2013). The future of 'Made in China'. *Mechanical Engineering Trend*, 169(10-12), 3-6.
- Luo, X. (2010). Product competitiveness and beating analyst earnings target. . *Journal of the Academy of Marketing Science*, 38(3), 253-264.
- Manoochehri, G. (2010). Measuring innovation: Challenges and best practices. *California Journal of Operations Management*, 8(1), 67-73.
- Mugge, R., & Dahl, D. W. (2013). Seeking the ideal level of design newness: consumer response to radical and incremental product design. *Journal of Product Innovation Management*, 30, 34-47.
- Nagashima, A. (1977). A comparative "Made In" product image survey among Japanese businessmen. . *The Journal of Marketing*, 95-100.
- Nijssen, E. J., & Douglas, S. P. (2004). Examining the animosity model in a country with a high level of foreign trade. *International Journal of Research in Marketing*, 21(1), 23-38.
- Ozer, M. (2011). The moderating roles of prior experience and behavioral importance in the predictive validity of new product concept testing. *Journal of Product Innovation Management*, 28(1), 109-122.
- Person, O., Schoormans, J., Snelders, D., & Karjalainen, T.-M. (2008). Should new products look similar or different? The influence of the market environment on strategic product styling. *Design Studies*, 29(1), 30-48.
- Phillips, L. W., Chang, D. R., & Buzzell, R. D. (1983). Product quality, cost position and business performance: A test of some key hypotheses. . *Journal of Marketing*, 47, 26-43.
- Postma, C. E. (2012). *Creating socionas: Building creative understanding of people's experiences in the early stages of new product development*. . (Doctoral Thesis.), Delft University of Technology, Delft.
- Rampino, L. (2011). The innovation pyramid: A categorization of the innovation phenomenon in the product-design field. *International Journal of Design*, 5(1), 3-16.
- Roy, R., & Riedel, J. C. (1997). Design and innovation in successful product competition. . *Technovation*, 17(10), 537-594.
- Rust, R., Lemon, K., & Zeithaml, V. A. (2004). Return on marketing: Using customer equity to focus marketing strategy. . *Journal of Marketing*, 68, 109-124.
- Schooler, R. D. (1971). Bias Phenomena Attendant to the Marketing of Foreign Goods in the U.S. *Journal of international business studies*, Spring, 71-80.
- Sklair, L. (1994). *The culture-ideology of consumerism in urban China: Some findings from a survey in Shanghai*. . Paper presented at the Research in consumer behavior, Greenwich.
- Slotegraaf, R. J., & Inman, J. J. (2004). Longitudinal shifts in the drivers of satisfaction with product quality: The role of attribute resolvability. . *Journal of Marketing Research*, 41, 269-280.
- Storvang, P., Jensen, S., & Christensen, P. R. (2014). Innovation through Design: A Framework for Design Capacity in a Danish Context. *Design Management Journal*, 9(1), 9-22.
- Suriñach, J., Autant-Bernard, C., Manca, F., Massard, N., & Moreno, R. (2009). The eDiffusion/Adoption of Innovation in the Internal Market *Economic Papers* (Vol. 384). Brussels European Commission , Directorate-General for Economic and Financial Affairs
- Tongberg, R. C. (1972). *An Empirical Study of Relationships Between Dogmatism and Consumer Attitudes Toward Foreign Products*. (Ph.D. dissertation), The Pennsylvania State University.

- van Boeijen, A. G. C. (2015). *Crossing cultural chasms: Towards a culture-conscious approach to design*. (Doctoral Thesis. ), Delft University of Technology., Delft.
- Verganti, R. (2009). *Design-driven Innovation: Changing the Rules of Competition by Radically Innovating what Things Mean*: Harvard Business Press.
- Wang, C.-K. (1978). *The Effect of Foreign Economic, Political and Cultural Environment on Consumers' Willingness to Buy Foreign Products*. (Ph.D. dissertation), Texas A & M University.
- Yeong, N. C., Mohamad, O., Ramayah, T., & Omar, A. (2007). Purchase preference of selected Malaysian motorcycle buyers: the discriminating role of perception of country of origin of brand and ethnocentrism. . *Asian Academy of Management Journal of Accounting and Finance*, 12(1), 1-22.
- Zhang, D., Hu, P., & Kotabe, M. (2011). Marketing–industrial design integration in new product development: The case of China. *Journal of Product Innovation Management*, 28(3), 360-373.
- Zhao, M., Hoeffler, S., & Dahl, D. W. (2012). Imagination difficulty and new product evaluation. *Journal of Product Innovation Management*, 29(S1), 76-90.

#### **About the Authors:**

**Peiyao Cheng** is the assistant professor in Design Department, Harbin Institute of Technology (Shenzhen). She earned her Master degree in Delft University of Technology and her Ph.D in the Hong Kong Polytechnic University. Her research focuses on consumers' evaluation of product designs.

**Cees de Bont** is currently the dean of design school, Loughborough University, UK. He was trained in consumer psychology and earned his PhD from Delft University of Technology. He spent 10 years in Philips Royal Electronics. He used to hold the deanships of the Faculty of Industrial Design Engineering in Delft as well as the School of Design of the Hong Kong Polytechnic University.