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Strategic recommendations for new product adoption in the Chinese market

Chih-Wei (Fred) Chao

Lecturer of Newcastle Business School
Faculty of Business and Law
The University of Newcastle, Australia
409 Hunter Street, Newcastle NSW 2300, Australia
Phone: + 61-2-49216389
Fred.Chao@newcastle.edu.au

Mike Reid

Professor of Marketing
RMIT University, Melbourne, Australia.
GPO Box 2476V Melbourne VIC 3000
Phone + 61-3-9925 1474
Mike.Reid@rmit.edu.au

Po-Hsin Lai

Lecturer of Newcastle Business School
Faculty of Business and Law
The University of Newcastle, Australia
409 Hunter Street, Newcastle NSW 2300, Australia
Phone: + 61-2-49216787
Po-Hsin.Lai@newcastle.edu.au

Vaughan Reimers

Senior Lecturer of School of Business
Federation University, Australia
Northways Road, Churchill 3842, Australia
Phone: +61-3-51226704
Vaughan.Reimers@federation.edu.au

Chih-Wei (Fred) Chao is a lecturer of Newcastle Business School, The University of Newcastle, Callaghan, NSW 2308, Australia, +61-2-49216389, Fred.Chao@newcastle.edu.au. Mike Reid is a professor of marketing, RMIT University, Melbourne, VIC 3000, Australia, +61-3-99251474, Mike.Reid@rmit.edu.au. Po-Hsin Lai is a lecturer of Newcastle Business School, The

University of Newcastle, Callaghan, NSW 2308, Australia, +61-2-49216787,
Po-Hsin.Lai@newcastle.edu.au. Vaughan Reimers is a senior lecturer of school of
business, Federation University, Churchill, VIC 3842, Australia, +61-3-51226704,
Vaughan.Reimers@federation.edu.au. Three authors contributed equally to this work.
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Abstract

This study extended current understandings of the relationships among domain specific innovativeness (DSI), the desire for unique consumer products (DUCPs), perceived new product characteristics (PNPCs), and Chinese consumers' new product adoption behavior. It also investigated the indirect effect of vicarious learning behavior on Chinese consumers' acceptance of new products. Data was collected in Shanghai, China. The results demonstrated that DSI and PNPCs were the primary drivers of new product adoption. The study also showed that PNPCs played a mediating role in the relationship between vicarious learning and the adoption of new products by Chinese consumers. The results confirmed the predictive power of DSI and how PNPCs affect Chinese innovative buying behavior. The results also suggest that PNPCs facilitate Chinese consumers' new product learning behavior.

Keywords: Consumer innovativeness; vicarious learning; new product adoption; emerging markets

Introduction

New products usually involve high uncertainties and risks for both consumers and firms, but are vital to firms seeking to reach new markets. Innovative products often struggle through the diffusion process in markets. Schnurr (2005) reported that even the world's most admired companies have found that their new products do not meet their desired financial objectives and have a failure rate above 50%. Empirical research suggests that consumer innovativeness plays a major role in influencing consumers' acceptance of new products (Chao, Reid & Mavondo, 2013; Roehrich, 2004; Rogers, 2003). A range of scales have been developed to measure consumer innovativeness (Goldsmith & Hofacker, 1991; Kirton, 1976; Raju, 1980).

Due to its ability to predict consumers' acceptance of new products, the influence of consumer innovativeness on consumers' new product adoption behavior is of fundamental interest to researchers and marketing managers (Hauser, Tellis, & Griffin, 2006; Rogers, 2003). However, scales of consumer innovativeness generally lack consensus, and findings on the strength of the relationship between scales measuring consumer innovativeness and new product adoption behavior have been mixed (Roehrich, 2004). Various consumer innovativeness scales have shown that domain specific innovativeness (DSI) is a better measure for capturing the attention of innovators and early adopters with a high tendency to adopt new products (Handa & Gupta, 2009; Klink & Athaide, 2010). Consequently, this study sought to examine the role of DSI in the success of new products and other measurements of consumers' personality traits and product attributes that affect new product adoption such as the desire for unique consumer products (DUCPs) (Lynn & Harris, 1997), vicarious learning (Chao, Reid & Hung, 2016) and Rogers' (2003) five new product

characteristics (PNPCs).

To date, the majority of consumer innovativeness and new product adoption studies have been conducted in developed Western countries (Wong & Tong, 2013). However, emerging markets are starting to gain attention from Western businesses. It would be problematic to apply existing theoretical discussions and empirical tests on consumer innovativeness and new product adoption to emerging economies. Thus, this research sought to empirically investigate the effectiveness of Chinese consumers' personality traits and product attributes in predicting new product adoption. First, this study examined the role of DSI, the DUCPs, and PNPCs in the adoption by Chinese consumers of new electronic products. Second, this study investigated whether PNPCs mediated the effects of Chinese consumers' vicarious learning on new products (VLNPs) and new product adoption.

The next section of this paper provides a review of studies related to the proposed research framework of this study. Then, the proposed hypotheses are set out. Finally, the implications of the research, conclusions, and ideas for future research are discussed.

Theoretical background

Emerging markets and the failure of new products

Due to exponential economic growth in the last decade, emerging markets have attracted the attention of multinational companies for innovation activities (Qian & Soopramanien, 2014). Notably, China's huge population and increasing consumer

income are two factors driving the launch of the new products that are vital for businesses survival (Wong & Tong, 2013). However, due to issues related to introducing new products to Chinese consumers, Western companies seeking to expand into the Chinese market face several issues. First, new products have a high failure rate. The concept of new product development has been extensively discussed by previous studies (Cooper & Kleinschmidt, 1995); however, a well-developed new product does not always guarantee high market success (Li, Zhang, & Wang, 2015). Gourville (2006) found that new product failure rate remains high (i.e., between 40% and 90%). Presently, the majority of research on the success of new product has been conducted in developed Western countries (Nakata, Im, Park, & Ha, 2006). Consequently, accurate data on the failure rates of new products in China is not available; however, it is likely that the failure rates in China are similarly high.

Second, due to the required behavior changes in the diffusion process, consumers are often reluctant to adopt new products (Rogers, 2003). This is of particular concern, as little is known about how consumer innovativeness influences Chinese consumers as distinct from consumers in Western countries (Jin & Li, 2007). Empirical studies that have used consumer innovativeness to measure new product adoption rates suggest that the level of consumer innovativeness does capture new product adoption rates (Im, Mason, & Houston, 2007; Tellis, Yin, & Bell, 2009). This study focused on the consumer psychological factors that firms should consider when pursuing new product opportunities in emerging markets, specifically in China.

Consumer innovativeness

Consumer innovativeness is an important indicator in classifying consumer segments

and has been shown to be an effective factor in predicting new product adoption (Im et al., 2007; Roehrich, 2004; Rogers, 2003). Empirical research suggests that consumer innate innovativeness is one form of consumer innovativeness that has no influence on new product adoption behaviour (Goldsmith, Freiden, & Eastman, 1995; Chao et al., 2013). Consequently, to specifically investigate the effect of consumer innovativeness on Chinese consumers' adoption behavior, the current research focused mainly on DSI.

Domain specific innovativeness (DSI)

It is problematic to consider consumer innovativeness generally across product categories (Goldsmith et al., 1995); for example, innovators in fashion products may be laggards in consumer electronic products (Hanada & Gupta, 2009; Klink & Athaide, 2010). Goldsmith and Hofacker (1991) defined DSI as 'the tendency to learn about and adopt product innovations (new products) within a specific domain of interest' (p. 210). To date, DSI extends to a variety of products and has been found to be useful in predicting new product adoption (Chao et al., 2016; Handa & Gupta, 2009; Hynes & Lo, 2006; Klink & Athaide, 2010; Citrin, Sprott, Silverman, & Stem, 2000). However, the vast majority of studies have been conducted in developed countries, including the United States (US), Germany, France, and Australia, and emerging markets has started to gain attentions. This study sought to examine the role of DSI on the adoption behavior of Chinese consumers to new products.

The desire for unique consumer products (DUCPs)

A need for uniqueness is one component of consumer innovativeness (Rogers, 2003;

Vandecasteele & Geuens, 2009). Innovators and early adopters with a high degree of consumer innovativeness tend to adopt new products earlier than others because using these new products enhances their feelings of uniqueness (Timmor & Katz-Navon, 2008). Lynn and Harris (1997) developed the concept of DUCPs, noting that ‘consumers differ in the extent to which they hold as a personal goal the acquisition and possession of consumer goods, services, and experiences that few others possess’ (p. 602). Consumers’ DUCPs has been proposed as an alternative measure for examining new product adoption, and is associated with consumer innovativeness (Ruvio, Shoha, & Brencic, 2008). However, little evidence has been found on the effectiveness of DUCPs on new product adoption in emerging markets. Chao et al. (2013) suggested that DUCPs had a weak significant relationship with new product adoption in China and recommended further investigation. Conversely, Keng, Tran, Lian, Yao, and Hsu (2014) found that DUCPs had a moderating role on brand attitude in Taiwan. This study added consumers’ DUCPs to the conceptual model.

Vicarious learning on new products (VLNPs)

New products involve a high level of uncertainty. Vicarious learning is one way to collect information about a new product (Srinivasan, Haunschild, & Grewal, 2007). Manz and Sims (1981) referred to vicarious learning as ‘the ability of individuals to learn by observing others’ and further noted that it enables individuals ‘to avoid needless and often costly error’ (p. 106). Empirical evidence has shown that innovators are the first to adopt an innovation, and do not observe others’ adoption behavior (Rogers, 2003). Chao et al. (2013) found that vicarious learning weakly influenced new product adoption in Australia, but found no significant relationship in China and Taiwan. Thus, vicarious learning appears to be irrelevant in predicting new

product adoption in emerging economies; however, China is classified as a collective society. Family members, relatives, and friends are the important information sources for both Chinese innovators and imitators (Wang, Dou, & Zhou, 2008; Chuang, Morgan, and Robson, 2012). Consequently, vicarious learning may play an important role in the collection of new product information and could indirectly influence Chinese consumers' new product adoption behavior.

Perceived new product characteristics (PNPCs)

The above sections focused on identifying consumers' characteristics and their influences on new product adoption. However, this study also sought to identify the PNPCs that enable or facilitate the flow of new product information to potential consumers and the effect of PNPCs on consumers making new product adoption decisions (Vander Schee, 2012). The five characteristics positively associated with new product adoption are relative advantage, compatibility, complexity, observability, and trialability (Rogers, 2003). Recently, price sensitivity and brand name were added to the five original characteristics (Aroean & Michaelidou, 2014; Thompson & Sinha 2008). Innovation characteristics can be transferred through vicarious learning to provide adopters with the values and benefits of new products, and thus hasten new product purchases (Flight, D'Souza, & Allaway, 2011). It was anticipated that consumers' perceptions of innovation characteristics would have a significant effect on the prediction of new product adoption in the Chinese market.

Research question and hypotheses

The factors influencing new product adoption were the central focus of this study. To

date, theoretical discussions and empirical tests on the diffusion of innovation in emerging economies have been limited. Adopting the experiences used by firms in developed economies to provide strategic recommendations to managers in the Chinese market could be problematic. This research sought to investigate the effect of DSI, DUCPs, VLNPs, and PNPCs on the adoption of new products in china. The main research question this study sought to answer was: What factors best predict Chinese consumers' new product adoption behaviour? Figure 1 sets out the study's theoretical conceptual framework.

Figure 1. Conceptual model

Empirical studies suggest that consumer innovativeness varies across product categories (Citrin et al., 2000; Im et al., 2007). Previous studies have shown that as a measure, DSI best captures innovators and early adopters with a higher tendency for new product adoption (Handa & Gupta, 2009; Klink & Athaide, 2010;

Xie, 2008). It was hypothesized that:

- H1. DSI has a positive and direct influence on a) ownership of new products, and
b) relative time of new product adoption (RTNPA).

Lynn and Harris (1996) suggested that the DUCPs is an alternative measurement of new product adoption behavior. Empirical studies have shown that the DUCPs significantly effects consumers' decisions in relation to new products (Chao et al., 2013). Thus, it was hypothesized that:

- H2. DUCPs has a positive and direct influence on a) ownership of new products,
and b) relative time of new product adoption.

It has been suggested that the communication of innovations among individuals is positively related to innovation characteristics (Holak & Lehmann, 1990). The more information potential adopters obtain about new products, the greater confidence they have when making new product purchase decisions. Further, individuals tend to discuss more innovations with greater relative advantages (i.e., one of the five innovation characteristics proposed by Rogers 2003). Thus, it was hypothesized that:

- H3. VLNPs have a positive and direct influence on PNPCs.

It has been widely accepted that certain PNPCs are essential to the success of a new product (Rogers & Shoemaker, 1971). From a consumer's perspective, innovation characteristics must be evaluated during the new product purchase decision-making process. Empirical research has suggested that the adoption of an

innovation is facilitated by how an individual perceives a new product (Flight et al., 2011). Thus, it was hypothesized that:

H4. PNPCs have a positive and direct influence on a) ownership of new products, and b) relative time of new product adoption.

Finally, previous studies have suggested that VLNPs do not have the ability to predict new product adoption (Chao et al., 2016). Further, it appears that VLNPs indirectly influence new product adoption through PNPCs. Thus, it was hypothesized that:

H5. PNPCs mediate the relationship between VLNPs and a) ownership of new products, and b) relative time of new product adoption.

Methodology

Research design

The fundamental purpose of this research was to examine the influences of DSI, DUCPs, and PNPCs on the adoption of new products among Chinese consumers. The study adopted a descriptive research design and made use of mall intercepts to collect data. The questionnaire comprised existing and modified measurement items designed to obtain information about the ability of selected existing scales in predicting the adoption of new products in the Chinese market. The questionnaire was translated into simplified Chinese versions by the researcher and reviewed by a qualified bilingual translator, and then translated back into English by two qualified bilingual

translators. A pre-test of the questionnaire by a convenient Chinese student sample was conducted in China before the final data collection process commenced. The questionnaire used seven-point Likert-type scales to measure the key variables.

Participants and procedure

Consumer electronic products that frequently change product life cycles and introduce new products to the market were chosen for the study. Participants were randomly selected from individuals passing by the front of shopping centers in Shanghai, China. The only limitation was that the participants had to be over 18-years of age and permanent Chinese residents. The final sample comprised 316 usable questionnaires. The demographics for the current study revealed that gender was equally distributed (males, $n = 163$, 51.6%). Half of the participants were aged between 26–35 ($n = 158$, 50.0%) and more than half of participants held undergraduate degrees ($n = 210$, 66.5%). The average household income of the Chinese participants was less than \$1,000 US dollars per month ($n = 135$, 42.7%).

Measures

Measurement of DSI. Previous research has suggested that consumer innovativeness varies across product categories (Goldsmith & Hofacker, 1991; Roehrich, Valette-Florence, & Ferrandi, 2003). The current study specifically examined consumer electronic products. To measure DSI, the study adapted Goldsmith and Hofacker's (1991) a six-item scale. Previous research has shown that the scale is unidimensional, highly reliable, and a valid measure of DSI in a specific product area (e.g., consumer electronics) (Chakrabarti & Baisya, 2009; Hoffmann & Soye, 2010;

Klink & Athaide, 2010).

Measurement of the DUCPs. To measure the DUCPs, this study used the DUCPs scale developed by Harris and Lynn (1996). Previous studies have shown that this scale is a reliable and valid measure of individual differences and explains the importance of consumer dispositions (Franke & Schreier, 2008; Keng et al., 2014).

Measurement of VLNPs. To measure VLNPs, the current study adopted the approach of Im et al. (2007) and included three factors: (i) exposure to advertising; (ii) modeling by significant others; and (iii) word of mouth. The study measured exposure to advertising by asking participants to report whether or not they had seen the selected new products in the mass media. The study measured modeling by asking participants to report whether or not individuals in their social networks owned the selected new products before they adopted the product. The study measured word of mouth by asking participants to report whether they had engaged in any personal conversations about the selected new products with another individual before they adopted the product.

Measurement of PNPCs. Flight et al. (2011) developed a scale to measure a wide range of product characteristics, and found a positive relationship between PNPCs and adoption. This study adapted their approach, focusing on Rogers' (2003) five innovation characteristics. The scale also considered price sensitivity to new products and the brand names of new products as additional characteristics.

Measurement of new product adoption. This study used two methods to measure new product adoption behavior: (i) cross-section method/ownership of new products; and

(ii) the RTNPA. The study defined new product ownership as the number of products a participant owned from selected consumer electronic products considered new at the time of the study. The study weighted RTNPA and the average of the length of the ownership of new products (i.e., the number of years or months since adoption). Some empirical studies have contended that the RTNPA is susceptible to recall biases (Midgley & Dowling, 1978); however, other studies have suggested that it helps to assess the convergent validity with the cross-sectional method (Midgley & Dowling, 1993; Im et al., 2007).

Analysis and results

Reliability and validity

Each scale was subject to exploratory and confirmatory factor analysis. The reliability of constructs and factors ranged from .71 to .80, indicating that each factor had good internal consistency (see Table 1). The study assessed convergent validity by computing average variance extracted (AVE) scores. The results show that each AVE was greater than the .50, indicating good convergent validity. The study assessed discriminant validity by comparing the minimum variance extracted for each pair of constructs with the square of the correlation between them. In all cases, the square of the correlations was less than the AVE score, indicating good discriminant validity.

The conceptual model

The study tested the proposed model using structural equation modeling to simultaneously examine the interrelationships among observed and unobserved

variables. The study suggested that PNPCs mediated VLNPs and new product adoption. To test the mediating effects of PNPCs, individual analyses were run for each mediator time within the model. The study measured indirect effects by using the product of the coefficients test to test the significance of the mediating effect by dividing the estimate of the indirect effect by its standard error. The standard error for the indirect effects was estimated by setting the bootstrap as 200 and a confidence level of 95%.

Table 1. Internal consistency, square root of average variance extracted and correlation matrix

Measurements	Internal consistency	Validity			
		1	2	3	4
1 Domain Specific Innovativeness	.71	.65			
2 Vicarious Learning on New Products	.76	.16	.63		
3 The Desire of Unique Consumer Products	.71	.02	.44	.72	
4 Perceived New Product Characteristics	.80	.08	.46	.50	.55

Overall, the results suggested that the model had an acceptable model fit for ownership of new products and RTNPA. Each measure of global fit indicated an adequate fit (see Table 2).

Table 3 sets out the beta coefficients from the relationship between DSI, the DUCPs, and PNPCs and new product adoption in the Chinese market as well as the t-values and respective levels of significance. The results supported H1a ($\beta = .36$, $t = 5.21$, $p < .001$) and H1b ($\beta = .42$, $t = 5.91$, $p < .001$), demonstrating that DSI is positively associated with new product adoption (both the ownership of new products and RTNPA). The results of the conceptual model did not support H2a and H2b,

demonstrating that the DUCPs did not influence the adoption of new products by Chinese consumers.

Table 2. Goodness of fit analysis

Goodness of Fit Measure	Result	Goodness of Fit Measure	Result
<u>Model Fit</u>		<u>Model Comparison</u>	
Chi-squared	230.55	Tucker-Lewis Index (TLI)	.91
Degrees of Freedom	119	Normed Fit Index (NFI)	.89
P-value	.000	Comparative Fit Index (CFI)	.93
Cmin/df	1.94		
Goodness of Fit Index	.92		
Adjusted Goodness of Fit	.89		
RMSEA	.06		

Table 3. Direct and mediating effect on the conceptual model

Hypothesis	Regression Coefficient (t-value)
H1a: DSI→Ownership	.36*** (5.21)
H1b: DSI→RTNPA	.42*** (5.91)
H2a: DUCP→Ownership	-.02 (-.29)
H2b: DUCP→RTNPA	-.08 (-1.19)
H3: VLNP→PNPCs	.30** (3.09)
H4a: PNPCs→Ownership	.34*** (5.21)
H4b: PNPCs→RTNPA	.31*** (3.62)
Mediating Effect	
Hypothesis	Regression Coefficient (t-value)
H5a: VLNP→PNPCs→Ownership	.14*** (3.76)
H5b: VLNP→PNPCs→RTNPA	.11*** (3.39)

*=p<.05, **=p<.01, ***=p<.001

The results supported H3, indicating that VLNPs had a direct effect on PNPCs ($\beta = .30$, $t = 3.09$, $p < .01$). The path from PNPCs to new product was significant for the ownership of new products ($\beta = .34$, $t = 5.21$, $p < .001$) and RTNPA ($\beta = .31$, $t = 3.62$, $p < .001$). Thus, H4a and H4b were supported. In terms of the mediating effect, the

results supported H5a and H5b for the ownership of new products ($\beta = .14$; $t = 3.76$, $p < .001$) and RTNPA ($\beta = .11$; $t = 3.39$, $p < .001$). Thus, it appears that PNPCs mediate the relationship between VLNPs and Chinese consumers' new product adoption behavior.

Discussion

The use of syndicated data from a large random sample of urban Chinese consumers generated insights on the effects of DSI, the DUCPs, and PNPCs on consumers' new product adoption behavior. It was found that DSI was positively related to new product adoption behavior. The results further support the findings of previous studies that DSI has a robust positive contribution in predicting new product adoption (Chao et al., 2013; Hanada & Gupta, 2009; Klink & Athaide, 2010). This finding also indicates that consumers' innovativeness vary across product categories. Among various existing consumer innovativeness scales, DSI had a more significant affect on consumers' new product adoption behavior in a global market context.

One hypothesis did not receive empirical support; DUCPs reflected individuals' psychological traits (e.g., consumer innovativeness), but were not significantly related to new product adoption in the Chinese market. However, this result is not completely surprising, as Chao et al. (2013) found only a weak relationship between the DUCPs and new product adoption. New products usually include a high level of uncertainty. Consumers from a collective society such as China have been found to be more risk averse than consumers in developed countries (Zhou, Su, & Bao, 2002). Thus, when making their purchase decisions, Chinese consumers may perceive a new product as having more risk than uniqueness.

The results showed a significant relationship between VLNPs and PNPCs. As further evidence of the importance of product attributes in a diffusion innovation context, PNPCs were found to positively influence new product adoption. This finding is consistent with the suggestion of Rogers (2003) that when innovation attributes are higher, a new product may attract more consumers and lead to strong positive adoption. Further, the results of the mediating analysis suggested that new product attributes mediated the relationship between VLNPs and Chinese consumers' new product adoption behavior. These findings supported the argument of Flight et al. (2011) that the communication of innovation attributes is a result of information acquisition that provides potential consumers with increased confidence when facing complex new product purchase decisions.

Conclusion and implications

The study investigated the relationship between DSI, DUCPs, PNPCs, and new product adoption by analyzing data collected in China. The findings of this study contribute to both theory and practice. First, a major strength of this study is that it validated results from Western countries on developed and tested measurements of individual personality traits and product attributes in a Chinese context. The DSI and PNPCs had acceptable reliability and validity, demonstrating considerable predictive power for Chinese innovative buying behavior. Thus, these scales can be used in future studies in Chinese speaking countries to examine new product adoption behavior.

Second, VLNPs affect consumers' perception of innovation characteristics. This

finding has important implications, as it suggests that Chinese consumers do consider vicarious learning as an important information source for new product adoption. Previous research has suggested that VLNPs have no impact on new product adoption (Chao et al., 2016); however, this study showed that new product attributes do facilitate Chinese consumers' learning and communicating of innovative product information, and thus increased new product adoption rates in China. This study took the early step in this research direction.

Managerial implications

The finding that DSI exerts significant influence on new product adoption has strong practical implications for firms considering developing and launching new consumer electronic products in China. The study confirmed that among various consumer innovativeness scales, DSI is crucial in predicting new product success in China. Thus, in identifying Chinese innovators and early adopters, DSI will be of particular importance to marketers in China.

Despite the dramatic effects of emerging markets on firms' strategies, and the growing economic significance of these markets, this study took an early step by examining VLNPs and PNPCs in new product adoption in China. As the advertising, word of mouth, and modeling (components of VLNPs) are important new product sources for Chinese consumers (both innovators and imitators), Chinese consumers are likely to use perceived PNPCs when making purchase decisions. This study's findings can be applied to assist in the management of new product development by matching new products with Chinese consumers' perceived innovation characteristics as suggested by Rogers (2003). Further, when consumers reach the stage of new

product information acquisition, marketers should focus on delivering PNPCs to Chinese consumers through either mass media or interpersonal communication channels, as the opinions of leaders and other new product information providers may have an informal influence on consumers.

Limitations and future research

This research sought to extend understandings of the direct and mediating effects of antecedents of new product adoption in China; however, it had several limitations. One such limitation applies to the research context in which the study was conducted; the study considered consumer electronic products. Consumer innovativeness and product attributes are context specific, and thus caution must be taken when generalizing the results of this study to other product categories. Further, the study was conducted in the major urban city of Shanghai, China. Thus, the findings of this study may be cultural-specific. Further empirical tests should be conducted before the model and findings are applied to other settings. Finally, the study did not show consistent results in relation to the measurement of the DUCPs. The results of the study indicated that the existing DUCPs scale did not capture Chinese consumers' new product adoption behaviors. This represents a significant gap that future research should address.

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