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A Meta-analysis of Online Impulse Buying and The Moderating Effect of Economic Development Level

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Abstract: With the prosperity of e-commerce and the increase in per capita disposable income of consumers, online impulse buying has become an epidemic. Various researchers explored what factors influenced consumers’ online impulse buying behaviors and the strength of each factor, but the conclusions were usually different. Therefore, this study constructed a comprehensive framework by using a meta-analysis to derive a unified conclusion. The meta-analysis was conducted according to 54 previous empirical studies about online impulse buying. The results show that website security, price, novelty, and negative emotion have no significant impact on online impulse buying. Meanwhile, the economic development level can moderate relationships between website visual appeal, ease of use, price, promotion, pleasure, positive emotion, and online impulse buying.

Keywords: meta-analysis, online impulse buying, economic development level, moderating effect

1. INTRODUCTION

With the prosperity of e-commerce and the increase in per capita disposable income of consumers, online impulse buying has become an epidemic. Triggered by easy access to products, easy buying process (e.g., 1-Click ordering), lack of social pressures, and absence of delivery efforts, impulse buying apparently occurs in about 40% of all online expenditures (Verhagen & Van Dolen, 2011). Online impulse buying can be defined as a sudden and immediate online purchase with no pre-shopping intentions (Verhagen & Van Dolen, 2011). The decision-making is unplanned, spontaneous, unreflective, and dominated by emotions. As insight into consumers’ impulse buying behaviors in online environment is vital for e-commerce practitioners, an increasing number of researchers explore the influence of the website quality (Hasim et al., 2018), the product involvement (Bhakat & Muruganantham, 2013; Bukidz & Tielung, 2014), socio-cultural factors (Bhakat & Muruganantham, 2013), and users’ emotional states (Bhakat & Muruganantham, 2013) on online impulse buying behaviors.

Despite considerable research on online impulse buying, research results are inconsistent due to the investigation time, the location of the survey, the target population, the number of samples and other force majeure factors. For example, some researchers found that online stores’ navigability had a strong positive relationship with online impulse buying (Zou, 2018), while other researchers showed that the influence of e-store’s navigation was insignificant (Floh & Madlberger, 2013). Meanwhile, the strength of correlation coefficients obtained in different studies was also inconsistent. These inconsistencies will bring some confusion to further theoretical studies and practical work. Therefore, we attempt to find an explanation for the contradictory results in literature by using a meta-analysis of empirical studies on online impulse buying. Meta-analysis is a method that statistically analyses a large collection of previous results from empirical studies for the purpose of integrating the findings (Glass, 1976).
The online impulse buying behavior was affected by various factors and different scholars classified those factors into diverse categories according to previous research results. In this study, we choose three aspects (i.e., website stimulus, marketing stimulus, and affective stimulus) as the classification category of 13 main factors that affect consumers’ online impulse buying. Considering that price plays an important role in consumers’ buying behavior, and price sensitivities are different thanks to the imbalanced economic development level. Meanwhile, the development level of information technology and information literacy are closely related to the development of economy. Therefore, we use the economic development level as a moderating variable in the relationship between factors and online impulse buying.

2. LITERATURE REVIEW

2.1 Website stimulus

In an online context, the impulse buying is influenced by not only the product characteristics but also the features of the shopping environment (i.e., the website) (Madhavaram & Laverie, 2004). Results of Zou (2018) showed that website security, navigability, and visual appeal had a strong positive relationship with online impulse buying behavior. In addition, online shopping environments are at a disadvantage when compared with brick-and-mortar stores due to the lack of touch, taste, or try products. Vonkeman et al. (2017) found that increased level of interactivity was likely to diminish a consumers’ perception of mediation by creating a sense of presence. On the other hand, the website ease of use refers to the website usability, which describes how easy it is to search information in a site and how easy the site can be navigated. Results of Liu et al. (2013) indicated that perceived website ease of use was a crucial online cue for engendering impulse buying online. Therefore, we consider website security, website navigability, website visual appeal, interactivity, and ease of use as factors in website stimulus that affect consumers’ online impulse buying.

2.2 Marketing stimulus

Consumers are constantly exposed to marketing stimuli that promote impulse buying with the popularity of multitudinous e-commerce shopping festivals. Scarcity creates a sense of urgency among buyers which results in increased quantities purchases, shorter searches, and greater satisfaction with products they have bought (Aggarwal et al., 2011). Findings of Wu et al. (2020) showed that both limited-quantity scarcity and limited-time scarcity led to online impulse buying. Price discounts are the most widely employed sales promotion strategies both online and offline, and online shoppers are more price-sensitive because of low search costs and direct price comparisons (Xu & Huang, 2014). Park et al. (2012) confirmed that price attributes on shopping websites played an important role in online impulse buying. Consumers usually engage in impulse buying in order to experience feelings of fun and novelty. Findings of Zou (2018) expressed that novelty has a strong positive influence on online impulse buying behavior. Moreover, in online shopping, a shopper may have no knowledge of certain products or no explicit intention to buy them, but is stimulated by some promotional offers. Conclusions of Hasim et al. (2018) indicated that sales promotions positively impacted online impulse buying behavior. Therefore, we consider scarcity, price, novelty, and promotion as factors in marketing stimulus that affect consumers’ online impulse buying.

2.3 Affective stimulus

Shopping in a network environment requires interaction with the website, and the interaction leads to both affective and cognitive reactions (Parboteeah et al., 2009). Affective reactions capture an individual’s emotional response when interacting with an environment, which results in subsequent cognitive reactions (e.g., impulse buying intention). For example, Shen and Khalifa (2012) found a significant positive effect of arousal on impulse buying when consumers felt the shopping environment was pleasant. Their research results also showed that pleasure was a significant determinant of impulse buying behavior. Findings of Suhud and Herstanti (2017)
indicated that positive emotion had a direct positive and significant impact on impulse buying. On the other hand, shopping is an experience sought for its ability to alleviate negative emotions and improve moods (Mano, 1999), people in depressed conditions are more likely to shop impulsively for the reason of improving their emotional states. Therefore, we consider arousal, pleasure, positive emotion, and negative emotion as factors in affective stimulus that affect consumers’ online impulse buying.

The research model established in this study is shown in Figure 1.

![Figure 1. Conceptual model](image)

### 3. METHODOLOGIES

#### 3.1 Data collection and coding

To retrieve as many articles related to online impulse buying as possible, we used “online impulse buying”, “online impulse purchasing”, “online impulse shopping”, “website stimulus”, “marketing stimulus”, and “affective stimulus” as key words. We searched literatures in some popular databases such as Google Scholar, Web of Science, Science Direct, SpringerLink, CNKI, etc. After the preliminary search, 1,345 initial papers were obtained.

We excluded 1,291 repetitive and inappropriate papers, and finally, 54 articles were included. The criteria of literature selection adopted in this study are: (1) the literature must be an empirical study of online impulse shopping and quantitatively tested relationships between antecedent factors and online impulse buying behavior; (2) the literature must report correlation coefficients or other values (e.g. F-value) that could be converted to correlation coefficients; and (3) the literature must report the sample size.

After carefully reading the articles selected for meta-analysis, we extracted the following information: author name, publication date, publications, investigated countries or regions, sample size, key constructs, and reported
effect sizes. At the same time, we merged the constructs with similar meanings as many constructs involved in these selected articles had different names that expressed similar meanings. Finally, we got a total of 13 relationships. To test the moderating effect of economic development level, all articles included in the meta-analysis were divided into two groups based on the economic development level of the country or region to which the sample belongs. The reference standard we used to divide is the data published by the World Bank ("Classifying countries by income," 2019).

3.2 Statistical analysis

We adopted R 3.6.0 to conduct the meta-analysis. It is important to choose the fixed-effect model or the random-effect model in a meta-analysis. When there is a single effect in the hypothesis sample, the fixed-effect model is selected, and when there are different effects in the hypothesis sample, the random-effect model is selected (Borenstein et al., 2007). In this study, we chose the random-effect model due to the differences in the samples. In addition, we used Q-test to examine the heterogeneity of the distribution of effect sizes, and calculated the Z-score to find potential moderating effects. Meanwhile, the publication bias of each relationship was examined by fail-safe N. If the fail-safe N is larger than “5*K + 10” (K is the number of studies), it can be argued that there is no publication bias (Rosenthal, 1979).

4. RESULTS

4.1 Correlation analysis

The effect sizes of each relationship in the model are combined, and the results are shown in Table 1. 95% CI (confidence intervals) of relationships between website security, price, novelty, negative emotion, and online impulse buying all include 0, and their combined effect sizes are not significant. Our findings point out that the website stimulus factors have a significantly positive relationship with online impulse buying except the website security, and the interactivity has the weakest relationship as its combined effect size is only 0.17. The scarcity and promotion both have a significantly positive relationship with online impulse buying in the marketing stimulus factors. The affective stimulus factors are significantly and positively related to online impulse buying except the negative emotion.

From the perspective of publication bias, values of fail-safe N of all factors are greater than “5*K + 10”, which means that all factors in this study have no publication bias.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Factors</th>
<th>Q-value</th>
<th>Combined effect size</th>
<th>95% CI</th>
<th>N_{fs.05}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website stimulus</td>
<td>Website security</td>
<td>311.40***</td>
<td>0.32</td>
<td>[-0.12; 0.65]</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>Website navigability</td>
<td>15.12**</td>
<td>0.36***</td>
<td>[0.23; 0.47]</td>
<td>126</td>
</tr>
<tr>
<td></td>
<td>Website visual appeal</td>
<td>170.72***</td>
<td>0.29***</td>
<td>[0.15; 0.41]</td>
<td>815</td>
</tr>
<tr>
<td></td>
<td>Interactivity</td>
<td>48.60***</td>
<td>0.17***</td>
<td>[0.07; 0.27]</td>
<td>138</td>
</tr>
<tr>
<td></td>
<td>Ease of use</td>
<td>232.43***</td>
<td>0.22*</td>
<td>[0.02; 0.40]</td>
<td>402</td>
</tr>
<tr>
<td>Marketing stimulus</td>
<td>Scarcity</td>
<td>9.26**</td>
<td>0.32***</td>
<td>[0.21; 0.42]</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Price</td>
<td>1587.28***</td>
<td>0.42</td>
<td>[-0.39; 0.86]</td>
<td>610</td>
</tr>
<tr>
<td></td>
<td>Novelty</td>
<td>111.39***</td>
<td>0.38</td>
<td>[-0.06; 0.070]</td>
<td>135</td>
</tr>
<tr>
<td></td>
<td>Promotion</td>
<td>597.29***</td>
<td>0.37***</td>
<td>[0.23; 0.51]</td>
<td>3383</td>
</tr>
<tr>
<td>Affective stimulus</td>
<td>Arousal</td>
<td>106.03***</td>
<td>0.40***</td>
<td>[0.29; 0.50]</td>
<td>1347</td>
</tr>
<tr>
<td></td>
<td>Pleasure</td>
<td>279.96***</td>
<td>0.41***</td>
<td>[0.31; 0.50]</td>
<td>3904</td>
</tr>
<tr>
<td></td>
<td>Positive emotion</td>
<td>238.27***</td>
<td>0.41***</td>
<td>[0.25; 0.54]</td>
<td>891</td>
</tr>
<tr>
<td></td>
<td>Negative emotion</td>
<td>828.47***</td>
<td>0.21</td>
<td>[-0.35; 0.66]</td>
<td>967</td>
</tr>
</tbody>
</table>

Note: *p<0.05, **p<0.01, ***p<0.001
4.2 Moderator analysis

Due to the limited number of selected articles, only one developed country’s data had been collected in the relationships between website security, interactivity, scarcity, novelty, negative emotion, and online impulse buying. Therefore, only 8 pairs of relationships can conduct the moderator analysis, and the results are shown in Table 2.

Most 95% confidence intervals exclude 0 except the relationships between ease of use and online impulse buying in the developed subgroup, price and online impulse buying in both groups, and positive emotion and online impulse buying in the developed subgroup. On the other hand, the results of the moderator analysis demonstrate that the economic development level moderates 6 pairs of relationships as Z-score of the website navigability and arousal are not significant. Specifically, the combined effect size of website visual appeal on online impulse buying in developed countries or regions is higher than that in developing countries or regions, which means that the website visual appeal is a vital predictor for online impulse buying in developed countries or regions. Likewise, the combined effect size of promotion on online impulse buying in developed countries or regions is higher than that in developing countries or regions, which means that online consumers in developed countries or regions are more likely to be influenced by sales promotion to make impulse consumptions. The combined effect sizes of other factors are opposite, values in developing countries or regions are higher than those in developed countries or regions. It is worth mentioning that the combined effect size of price on online impulse buying in developed countries or regions is very little, which indicates that consumers in developed countries or regions are more likely to ignore price factors when make online impulse buying.

Table 2. The results of moderator analysis

<table>
<thead>
<tr>
<th>Categories</th>
<th>Factors</th>
<th>Economic development level</th>
<th>Combined effect size</th>
<th>95% CI</th>
<th>Z-score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website stimulus</td>
<td>Developed</td>
<td>0.35</td>
<td>[0.26; 0.43]</td>
<td>0.13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Developing</td>
<td>0.36</td>
<td>[0.08; 0.59]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Website navigability</td>
<td>Developed</td>
<td>0.50</td>
<td>[0.33; 0.63]</td>
<td>-8.62***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Developing</td>
<td>0.23</td>
<td>[0.07; 0.38]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Website visual appeal</td>
<td>Developed</td>
<td>0.10</td>
<td>[-0.08; 0.26]</td>
<td>4.63***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Developing</td>
<td>0.27</td>
<td>[0.02; 0.48]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ease of use</td>
<td>Developed</td>
<td>-0.04</td>
<td>[-0.47; 0.41]</td>
<td>18.53***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Developing</td>
<td>0.64</td>
<td>[-0.43; 0.96]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marketing stimulus</td>
<td>Developed</td>
<td>0.43</td>
<td>[0.06; 0.69]</td>
<td>-3.07**</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>Developing</td>
<td>0.36</td>
<td>[0.19; 0.50]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Promotion</td>
<td>Developed</td>
<td>0.43</td>
<td>[0.01; 0.58]</td>
<td>3.85***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Developing</td>
<td>0.44</td>
<td>[0.34; 0.53]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affective stimulus</td>
<td>Developed</td>
<td>0.22</td>
<td>[-0.14; 0.53]</td>
<td>5.41***</td>
<td></td>
</tr>
<tr>
<td>Arousal</td>
<td>Developing</td>
<td>0.43</td>
<td>[0.24; 0.58]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pleasure</td>
<td>Developed</td>
<td>0.33</td>
<td>[0.01; 0.58]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Developing</td>
<td>0.44</td>
<td>[0.34; 0.53]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive emotion</td>
<td>Developed</td>
<td>0.22</td>
<td>[-0.14; 0.53]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Developing</td>
<td>0.43</td>
<td>[0.24; 0.58]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * p<0.05, ** p<0.01, *** p<0.001
5. DISCUSSION

This study examined the impact of 13 factors (i.e., website security, website navigability, website visual appeal, interactivity, ease of use, scarcity, price, novelty, promotion, arousal, pleasure, positive emotion, and negative emotion) on consumers’ online impulse buying, and explored the moderating effect of economic development level by using a meta-analysis. The results of this study provide both theoretical and practical constructions for e-commerce platforms and merchants.

First, this study proposed a comprehensive framework by integrating 54 previous empirical studies and divided 13 selected factors into website stimulus, marketing stimulus and affective stimulus, which helped scholars understand consumers’ online impulse buying behaviors from multiple dimensions.

Second, this study chose economic development level as the moderator of relationships between factors and online impulse buying, and verified that economic development level had a significant moderating effect on relationships between website visual appeal, ease of use, price, promotion, pleasure, positive emotion, and online impulse buying. The result indicates that when researchers explore the impact of website visual appeal, ease of use, price, promotion, pleasure, and positive emotion on online impulse buying in the future, they should pay full attention to the moderating effect of economic development level.

Third, managers and developers of e-commerce platforms should take website navigability, website visual appeal, interactivity, ease of use, scarcity, promotion, arousal, pleasure, and positive emotion seriously as these factors are significantly and positively related to online impulse buying in the research results.

Finally, results of the moderator analysis can give an inspiration for cross-border trade practitioners. For cross-border e-commerce practitioners, when the target customers are people in developed countries or regions, website visual appeal and promotion are the main attractions to consumers. In contrast, when the target customers are people in developing countries or regions, ease of use, price, pleasure, and positive emotion more appeal to consumers. That is, in developing countries or regions, to provide users with a pleasant buying experience, more efforts should be put into website operation simplification and product pricing strategy.

6. CONCLUSION

Based on the meta-analysis, this study utilizes a quantitative review method to integrate the consistent or inconsistent conclusions of previous studies, and reaches a unified view. The results of this study have specific development significance for both researchers and online buying service providers. Despite the implication of this study, there are still some limitations.

First, the number of relevant studies that can be used for meta-analysis of online impulse buying is limited. In addition, although we have included the most investigated factors of online impulse buying in the meta-analysis, there are other factors that may also have a significant effect. Finally, the classification of the sample into developed and developing countries or regions based on the economic development level may be too crude. The moderating effect of 5 relationships were not examined due to the limited number of samples in developed countries or regions.

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