An Experimental Study of User-Customized Products Online

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Abstract

With the rapid development of online shopping, the simple form of online shopping can not meet the personalized needs of consumers. The paper studies the decision support system for user-customized products online.

This paper concentrates on the differences in consumer behavior through an experimental study of an alternative-based DSS and an attribute-based DSS for product customization by online consumers. In addition, we examine the moderating effect of attribute importance in the use of an online customer decision support tool. Using the independent assessment, joint assessment and cognitive fit theories, we develop a model with four mediate variables (perceived usefulness, perceived ease of use, perceived enjoyment, and perceived control) and two dependent variables (intention to purchase and intention to return).

Keywords: alternative-based decision support tool, attribute-based decision support tool, attribute importance, perceived usefulness, perceived ease of use, perceived enjoyment, perceived control

1. Introduction

The existing research on decision support tools is numerous and mature, but the application of these decision support tools enable consumers to search for the goods they want from many products faster and more accurate. For example, recommendation agents and comparison matrix, can elicit the interests or preferences of individual users for products, and then make recommendations accordingly, thus consumers will make purchase decision convenient[1,2]. The use of this type of decision support tool facilitates consumers to select their own favored products from the existing, multi-brand and various ones. However, the alternative-based and attribute-based decision support tools which enable consumers to achieve customization[3], are different in this paper. At the present stage, studies about the two decision support tools concentrate on the different choice set sizes, and the number of alternatives and attributes directly affect the complexity of the choice making task[4]. This article will focus on the difference between alternative-based decision support tool and attribute-based decision support tool when the choice set size is small.

In addition, the attribute importance of products will change our whole attitude of goods, and then influence our purchasing decision[5,6]. The existing research has provided many ways to distinguish the attribute importance of goods[7-9], and the attribute importance will also affect consumer behavior[9-11]. In order to examine the moderating effect of attribute importance in the use of decision support tools,

we will apply the method of judging attribute importance to product customization.

The choice set size of goods which will affect customer satisfaction[4,12-14], is a control variable that we haven't do more research about.

In this paper, we examine how four mediate variables (perceived usefulness, perceived ease of use, perceived enjoyment, and perceived control) mediate the effect of decision support tools on intention to purchase and how demographic variables affect purchase decision of consumers.

In the next section we introduce the research model and hypotheses. We follow that with the description of the research

design and measurement instrument, data analysis and conclusion.

2. Research model and hypotheses

The theoretical model is shown in Figure 1 and based on prior literature. The model suggests that the effect of decision support tools use on decision outcomes (intention to purchase and intention to return) is fully mediated by the mediate variables of perceived usefulness, perceived ease of use, perceived enjoyment, and perceived control. Further, attribute importance moderates the effect of decision support tools use on several mediate variables. Finally, the choice set size is hypothesized small.
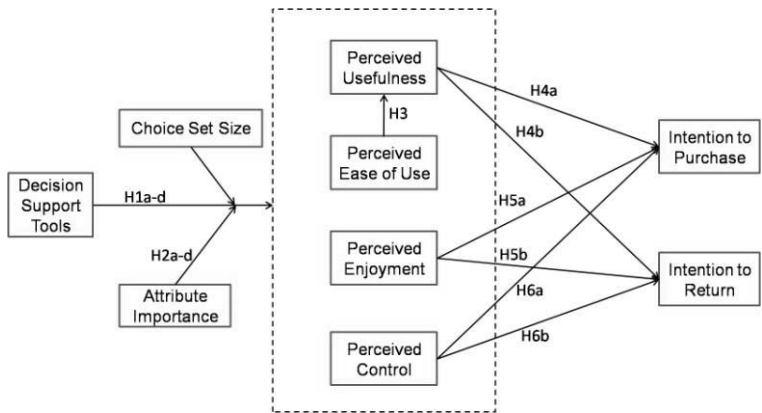

Fig. 1: Research Model.

When the choice set size is small, users of an alternative-based decision support tool express lower task complexity than users of an attribute-based one. Consumers using alternative-based decision support tool can compare the different values of the same attributes of goods and find out which is better to meet their own preferences (joint assessment[15]), but attribute-based decision support tool can not(independent assessment). In addition, because the choice set size is small, consumers do not worried about that their use

of alternative-based decision support tool will neglect some value of the attributes, they will not feel regret. In a word, when the choice set size is small, alternative-based decision support tool improves the shopping results better than attribute-based one.

H1a-d: Users of an alternative-based decision support tool express higher perceived usefulness, perceived ease of use, perceived enjoyment, perceived control than users of an attribute-based one.

As is shown from the Figure 1, attribute importance moderates the effect of decision support tools use on several mediate variables. When the choice set size is small and consumers select the important attribute of goods, consumers want to choose their own preferred value of the attribute. At this time, the use of alternative-based decision support tools can display all values of attributes and allow consumers to compare by joint assessment which can reduce the complexity of information, according to the cognitive fit theory[16,17], a good fit between the task and the tool used has been shown to have a positive effect on mediate variables. On the contrary, if consumers select the unimportant attribute of goods, they may want to make a choice quickly but not to find the optimal value. So in this case, attribute-based decision support tools enable users to quickly view more attribute options to reduce the complexity of information, a good fit between the task (make a choice quickly) and the tool (attribute-based decision support tool) used has been shown to have a positive effect on mediate variables, so the attribute-based decision support tool will be more appropriate.

H2a-d: When the attribute is important, users of an alternative-based decision support tool express higher perceived usefulness, perceived ease of use, perceived enjoyment, perceived control than users of an attribute-based one. When the attribute is unimportant, users of an attribute-based decision support tool express higher perceived usefulness, perceived ease of use, perceived enjoyment, perceived control than users of an alternative-based one.

According to the existing research findings in technology acceptance model[4,18-20], we posit

H3: Perceived ease of use will positively affect perceived usefulness.

H4a,b: The effect of alternative-based decision support tool use on intention to purchase and intention to return is fully mediated by the users' perceived usefulness.

H5a,b: The effect of alternative-based decision support tool use on intention to purchase and intention to return is fully mediated by the users' perceived enjoyment.

H6a,b: The effect of alternative-based decision support tool use on intention to purchase and intention to return is fully mediated by the users' perceived control.

3. Methodology

3.1. Study design

According to the research model, we employed a 2×2 factorial design (Table 1). There were two versions of the website (attribute-based decision support tool, alternative-based decision support tool) (Figure 2 and Figure 3) that were used for buying sweater using one choice set size (9). Participates were asked to purchase a sweater they preferred, the color of sweater (important attribute) and the color of words in sweater (unimportant attribute) can vary.

3.2. Instrument

For our survey instrument, we adapted established scales for mediate variables and dependent variables from prior literature[4,19].

4. Data analysis

4.1. Sample

The sample used for this study consists of 83 subjects who are all undergraduate students. The demographics of the sample can be seen in Table 2. Our subjects are all between the ages of 21 and 24, 48.2 percent of which are female, and 59 per-

cent spend above 5 hours online each day, the number of online shopping, however is few each year. Our assumption of attribute importance has been proved in table 2‐ ‐ the color of sweater is an important attribute and the color of words in sweater is an unimportant attribute.

Fig. 2: The Alternative-based Decision Support Tool for Sweater.

Fig. 3: The Attribute-based Decision Support Tool for Sweater.

experimental group		decision support tools	
		alternative-based decision support tool	attribute-based decision support tool
attribute importance	the color of sweater	group 1	group 2
	the color of words in sweater	group 3	group 4

Table 1: Experimental Group.

Variable	Frequency（%）	Variable	Frequency（%）
Gender		primary attribute	
Male	43(51.8%)	color inside the hat	0(0)
Female	40(48.2%)	color of pattern	8(9.6%)
Age		color of the hat	3(3.6%)
21	15(18.1%)	color of the words	5(6%)
22	36(43.4%)	color of the sweater	66(79.5%)
23	21(25.3%)	secondary attribute	
24	10(12%)	color inside the hat	4(4.8%)
The average time spent online each day		color of pattern	30(36.1%)
<1 hour	1(1.2%)	color of the hat	6(7.2%)
1-3 hours	5(6%)	color of the words	32(38.6%)
3-5 hours	28(33.7%)	color of the sweater	11(13.3%)
>5 hours	49(59%)		
The number of online shopping every year			
<5	44(53%)		
5-10	22(26.5%)		
10-15	6(7.2%)		
>15	11(13.3%)		

Table 2: Subject Demographics.

There are no significant differences in gender (P=0.47>0.05, P=0.492>0.05), age(P=0.574>0.05, P=0.239>0.05), the average time spent online each day (P=0.585>0.05, P=0.465>0.05), or the number of online shopping every year (P=0.098>0.05, P=0.144>0.05) among the 4 experimental conditions by ANO-

VA. However, intention to purchase and intention to return of female are greater than male, and the one who has long time spent online each day and more time of online shopping will be in greater intention to purchase and intention to return.

4.2. Tests of assumptions

In order to test the validity of the questionnaire, the cronbach α of the four mediate variables are 0.8778, 0.8941, 0.7326 and 0.8464. In order to test the validity of the model, we performed confirmatory factor analysis using structural equation modeling with AMOS. The model's fit statistics ($\chi 2/df$ = 2.143; RMR=0.062; RMSEA=0.118; GFI = 0.839; AGFI=

0.733; IFI = 0.907, CFI = 0.904) showed that the model had good fit.

We used MANOVA with SPSS 16.0 to test the assumption. Firstly, perceived usefulness and perceived enjoyment of consumers when using different decision support tools have significant difference (Sig<0.05, Sig<0.05), but perceived ease of use and perceived control are not (Sig=0.552>0.05, Sig=0.657>0.05). Therefore, H1a and H1c are supported, while H1b and H1d are not. Secondly, we tested the hypotheses on the moderating effects of attribute importance and the results can be seen in Figure 4-7, in which H2a and H2c are supported, while H2b and H2d are partial supported.
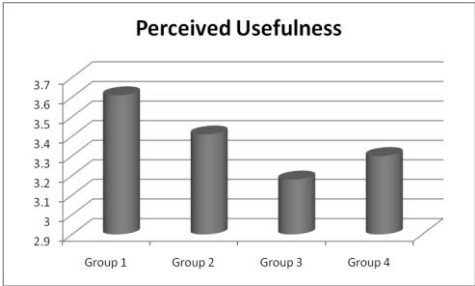
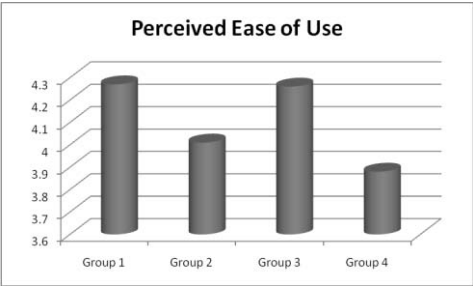

Fig. 4: Means of Perceived Usefulness.

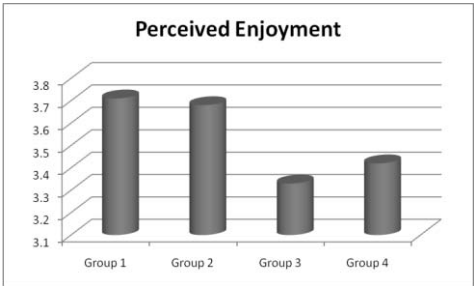Fig. 5: Means of Perceived Ease of Use.

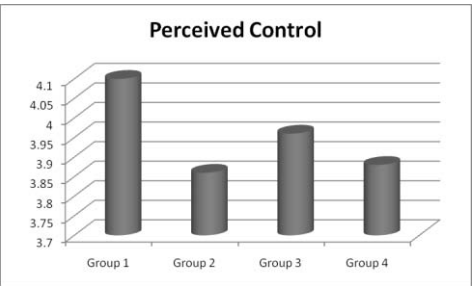Fig. 6: Means of Perceived Enjoyment.

Fig. 7: Means of Perceived Control.

Finally, we tested the mediating role of the mediate variables between decision support tool use and the two dependents by regression analysis. For perceived usefulness, Sig=0.002<0.05 and Sig=0.000<0.05, for intention to purchase

and intention to return respectively. For perceived enjoyment, Sig=0.033<0.05 for intention to return respectively. Therefore, H4a, H4b and H5b are supported, while H5a, H6a and H6b are not.

5. Discussion

5.1. Contributions

The independent assessment and joint assessment have been used in the research to examine the impact of different decision support tools.

5.2. Implications for practice

Our results show: (1) The visual comparison capability of alternative-based decision support tool can increase user's confidence in decision making. (2) Attribute importance moderates the effect of decision support tools use on several perception variables. (3) When the choice set is small, online merchants who offer alternative-based decision support tool are more popular.

6. Conclusion

(1) Users of an alternative-based decision support tool express higher perceived usefulness and perceived enjoyment than users of an attribute-based one. (2)When the choice set is small and the attribute is important, users of an alternative-based decision support tool express higher perceived usefulness and perceived enjoyment than users of an attribute-based one. When the choice set is small, and the attribute is unimportant, users of an attribute-based decision support tool express higher perceived usefulness and perceived enjoyment than users of an alternative-based one. (3)The effect of alternative-based decision support tool use on intention to purchase and intention to return is fully mediated by the users' perceived usefulness, and the effect of alternative-based decision support tool use on intention to return is mediated by the users' perceived enjoyment.

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