A study of consumer preferences for e-retailers' attributes: an application of conjoint analysis

BEGOÑA PERAL-PERAL, JOAQUINA RODRÍGUEZ-BOBADA-REY,
ANGEL F. VILLAREJO-RAMOS, MANUEL J. SÁNCHEZ-FRANCO
Business Administration and Marketing Department
University of Seville
Av. Ramón y Cajal, s/n (41018)
SPAIN
bperal@us.es, joaquina@us.es, curro@us.es, majesus@us.es

Abstract: - The aim of this paper is to determine and analyse consumer preferences regarding the profiles of an e-retailer's website. Two types of products are examined to test whether there are differences in the individuals' preferences. We conduct an initial study, from which we identify the principal attributes valued by the participants in the survey. These attributes are then used to design the profiles for the conjoint analysis.
The variables that are most relevant to the shopping task are those which receive a higher response frequency. There are differences in the relative importance assigned to the attributes, depending on the product type, but no significant differences are found in the participants' preferences when these are analysed according to gender or previous experience of online shopping.

Key-Words: e-retailers, consumer behaviour, conjoint analysis, individuals' preferences.

1 Introduction

Previous studies have analysed the relative importance of the attributes of a website; i.e., "those factors both functional and psychological that exist in an online store" [26, p.501] -for instance, the price, the brands, the firm's reputation or the privacy and security policy. Palmer (2002) and Yun and Good (2007) found that not all of a website's attributes will receive the same favourable response from online consumers, being essential to identify and focus on developing attributes which increase value for the customer, and not waste resources on attributes the consumer considers to be less important [17, 1, 38].

Prior works have focused on understanding whether a consumer's preference for online shopping changes with different types of products [24]. In this investigation the products -we have chosen- are pleasure trips and laptop computers. In Spain, during 2008, 52.4% and 43% of Internet shoppers bought travel tickets and booked accommodation respectively; and one in four shoppers bought online electronic products [33]. This distinction between these products (i.e., hedonic and utilitarian) allows us carry out a conjoint analysis to test whether there are differences in the importance given to attributes.

Following a literature review, we explain the methodology used and the reasons for our choice. We then set out the results of our conjoint analysis and propose a number of arguments and implications for their development, the study's limitations and future lines of research.

2 Conceptual Background

To understand a consumer's choice of e-retailer, we must consider the relative importance that consumers give to its attributes at the time of purchase [26]. Therefore, prior researches have analysed the online store's attributes as predictors of the consumers' intention to buy [1, 38], their satisfaction, their acceptance of new technology, their attitude towards online purchases [26] and customer loyalty [39].

The different attributes of an online retailer proposed are: merchandise, convenience, interactivity, navigation, reliability, promotions and design.

Merchandise

The dimensions attributed to the aspects of an e-retailer's merchandise include product information, brands, breadth and depth of the assortment and price [38, 39, and 35]. The variety in the online offering influences on its adoption as a purchasing method, because it enables consumers to compare, contrast and choose between the alternatives available, while reducing the search costs [14]. Empirical evidence also confirms that Internet buying is influenced by consumers' perception of a price advantage [31, 13]. It is more important for online shoppers than for offline shoppers [17], since the consumer has rapid

and simultaneous access to pricing information online.

Convenience

Convenience is one of the most attractive and significant elements for the online consumer, because it reduces the search costs when time is limited, increasing efficiency for the online shopper and eliminating displacement costs [10].

Several studies have demonstrated the significant effect of the speed and convenience of e-commerce on the decision to use this commercial channel [31]. E-retailers reduces effort and ease of localisation [26], compared to shopping in offline stores. Indeed, convenience is the main reason for the increase in online purchases [23] including the number of links into the site, the variety of payment options, quick jump buttons and images, the inclusion of pricing information and the product portfolio.

Interactivity

Interactivity refers to the extent to which an e-retailer allows the consumer to enter into direct, two-way communication at any time [26]. Interactivity is the most important determinant in forming a consumer's attitude towards an e-retailer [30], with a positive influence on the perceived quality of the website [12] and adoption of e-commerce [31].

Navigation

Site navigation refers to the appearance and design of a website and the possible sequence of clicks, images and paths [26, 1]. Among the factors associated with customer service it is worth emphasising ease of access to information [20, 26]. Online search costs are the web connection time, the time and effort expended by the user in finding the e-retailer's website and the time taken to download the information. Internet users cannot tolerate waiting to open a website, and are more affected by the perceived duration of the download time than by the actual waiting time [9]. Navigation influences their satisfaction.

Reliability

The reliability of an online company encompasses dimensions such as security, privacy and reputation. The risks associated with an online purchase are seen to be alleviated when an e-retailer can guarantee the security and privacy of the personal data required for the purchase [1]. Equally, an e-retailer's reputation has a positive and significant effect on the consumer's decision to buy. Information about an e-retailer can reduce a potential customer's uncertainty and perceived risk [26].

It has been observed that a lack of reliability has a negative effect on the take-up of e-commerce [20], on the frequency of transactions [32], on future intentions to buy [25] and attitudes towards the channel [18].

Another attribute related to reliability is the existence of a physical store. An e-retailer can operate with an online store only, or as a traditional retailer, with offline and online stores [26]. The consumers perceive greater security when the e-retailer has a physical store [17, 22].

Promotions

Promotions act as an immediate economic incentive to purchase a product. They can also be used as a means of evaluating a product and an online store [36] and can help to create a positive image [7]. Promotions are also an effective way of attracting new customers and encouraging them to make an initial purchase [8] as well as motivating consumers to switch brands [36]. Moreover, it has been found that price promotions, such as discounts, increase the perceived value of the transaction and to increase satisfaction and the intention to buy [8, 35].

Design

The influence of the recreational dimension on online purchasing behaviour has been tested in numerous researches [18, 39 and 28]. In particular, Eroglu *et al.* (2001) define the website design like low task-relevant variables as those which are relatively unimportant for completing the online shopping task. Design includes elements such as colour, borders, text style and fonts, animation, music and sound, entertainment, a web counter, page affiliates and decorative images. Contra wise, according to the S-O-R paradigm [29], these variables could be manipulated by the e-retailers to (a) increase the consumer's pleasure and excitation, and their intention to buy [10], and (b) affect the consumer's emotional state -adding to the hedonic and experiential value of the purchase [23].

3 Methodology

Conjoint analysis is a multivariate technique used specifically to understand how respondents in a survey develop their preferences for products, services or stores. The technique is based on the fact that an individual's choice behaviour is governed by the maximisation of their preferences and that an item can be viewed as a set of attributes from which individuals can attain total utility [15].

The first stage in the application of a conjoint analysis is to identify the attributes which will comprise the desired profile. In this paper we identify these attributes from the literature review and by carrying out an exploratory investigation [27] using convenience sampling. Prior research has used this

sampling method in the context of e-commerce or internet use [26, 16 and 4].

The convenience sample consisted of 150 university students. The behaviour of undergraduate students is often analysed in the B2C literature [e.g. 5, 26, 24 and 19]. Academic review and test generate forty initial attributes. The participants were required to select the ten most important attributes when making a purchase from an online store.

The products analysed are a pleasure trip and a laptop computer. These products have commonly been analysed in prior research [6, 22 and 1]. Examining two product types we are able to analyse whether the product category affects the importance ascribed to the attributes of a virtual store. The determinants of online trust and consumers' preferences differ according to product type [1, 24].

3.1 Results of initial study

We received 140 valid questionnaires. 65% were female, 92% was under 27 years of age, 65% had made an online purchase in the previous year and 78% intended to do so over the coming year.

Table 1: Initial study: % of choice of attributes

Attributes *Order of attributes is a function of the highest % of choice for pleasure trip.*	Pleasure trip % of choice	Laptop computer % of choice
Price of the product / service	77.857	80.714
Product guarantee and returns policy	64.286	77.857
Data security and privacy policies	61.429	52.857
Payment information	55.000	40.714
Products images	46.429	53.571
Existence of alternative payment	45.714	46.429
Make phone or e-mail contact	40.714	38.571
Option to reserve products	39.286	17.857
Company reputation	38.571	36.429
Posting customer reviews	37.857	30.714
Information on how to buy	36.429	30.714
Information on postage and packing costs	32.143	40.000
Technical product description	30.714	61.429
Well-know brands	20.000	32.143
Physical store distributor	17.142	32.143

The students indicated the most important attributes of a virtual store (Table 1) some of which are common to both products, while others show statistically significant differences according to the product. Participants in pilot study have the profile of internet shoppers in Spain [33].

3.2 Application of conjoint analysis

The first step was to select the most important attributes –those which were most frequently chosen in the pilot study [2, 1]. We used a different list of attributes for each product. There were nine in total

with seven attributes in common. The second step was to decide on the levels for each attribute, making them realistic in order to increase the validity of the preferences (Table 2).

Table 2: Attribute and attribute levels

Attributes		Attribute levels
Common to both products	Price of product /service	High products price Medium products price Low products price
	Product guarantee and returns policy	Yes No
	Data security and privacy policies	Both policies Either policies No policies
	Products images	Yes No
	Existence of alternatives Payment	Credit card Cash payment Pay by instalments
	Options to make phone or e-mail contact	Yes No
	Information on postage and packing costs	Yes No
Only for pleasure trip	Options to reserve product	Yes No
	Posting customer reviews	Yes No
Only for laptop computer	Technical product description	Yes No
	Physical retailer store	Yes No

Our study consisted of six attributes with two levels and three attributes with three levels for each product analysed, giving a possible 1,728 combinations. Given the difficulty of evaluating such a high number of combinations we used a fractional factorial design, which provides an appropriate fraction of all the possible combinations of the attribute levels. The orthogonal matrix was designed using the SPSS 18 Orthoplan Procedure, which captures the main effects of each attribute. This matrix consists of eighteen profiles, sixteen of which were used to estimate the model parameters and the remaining two were used to validate the results.

To estimate the model's parameters, the relative importance of the attributes and the partial utility of the levels, we used the SPSS 18 Conjoint Procedure. For the internal validation measures we used the Pearson correlation coefficient and the Kendall *tau* coefficient.

Finally, the sample used to obtain the data consisted of undergraduate students from different courses (257 valid responses for both products), who had not participated in the initial questionnaire. Descriptive analysis for both the pilot study and the conjoint analysis were very similar and we can therefore assume that it is acceptable to apply the most important attributes for the choice of an e-retailer, identified in the pilot study and the conjoint analysis.

4 Analysis of the results obtained from the conjoint analysis

In the case of a pleasure trip, the attributes that are most valued by the participants are (a) virtual store's security and privacy policy, (b) price list and (c) products images. The participants' satisfaction with each level of the attributes enables us to identify the sample's preferred online retailer. This will be the store that combines the levels with the greatest partial utility: providing low product prices, a product guarantee and returns policy, product images, data security and privacy policies, the option for the customer to pay by instalments, the option to make telephone or e-mail contact, clearly visible postage and packing costs, the option to reserve products and posting customer reviews.

As for the reliability of the results, the Pearson correlation coefficient is 0.990, and the Kendal *tau* is 0.883, which indicates that the results obtained are reliable. Kendall *tau* coefficient for the two holdout profiles and their value of 1 confirms the validity of the results.

In the case of the laptop computer, the attributes given the highest value by the participants are: (a) data security and privacy policies, (b) product price and (c) product guarantee and returns policy. The levels that comprise the ideal profile are low product prices, a product guarantee and returns policy, product images, the implementation of a data security and privacy policies, the ability to pay by instalments, the ability to contact the store by telephone or e-mail, clearly visible postage and packaging costs and a physical store.

With regard to the reliability of the results, the Pearson correlation coefficient values and Kendall t*au* (0.986; 0.9) show that the results are reliable. The Kendal *tau* for the holdout profiles also has a high value.

The most important attribute is the concern for privacy and security, which was accorded the highest value in the travel category (see Table 3). Privacy is given a greater value for products which involve sensitive data, such as a trip, since this requires information such as a customer's whereabouts and activities [1]. In second place is pricing information, which is also more important in the pleasure trip case [6]. Two other attributes, the product guarantee and return policy and information on payment methods, are given similar relative importance.

There are differences in the relative importance given to the other attributes. These results may be explained by the product type. In the case of the computer, the customer is in high rational purchase, which means that the search for information is focused more on the technical aspects of the product. For the trip, on the other hand, the purchase requires high emotional involvement for the customer, in which there is a search for information, but with a greater focus on the hedonic-pleasurable elements.

Table 3: Relative attribute importance and part-worth utilities of attribute levels for both products

Attributes	Relative import. Pleasure trip	Relative import. Laptop comput.	Levels	Pleasure trip		Laptop computer	
				Part-worth utility estimat.	Std. Error	Part-worth utility estimat.	Std. Error
Price of product/service	13.522	12.765	1	-0.212	0.098	-0.103	0.119
			2	-0.125	0.129	-0.074	0.138
			3	0.337	0.129	0.177	0.138
Product guarantee and returns policy	11.351	11.357	1	0.381	0.074	0.365	0.089
			2	-0.381	0.074	-0.365	0.089
Products images	11.570	10.038	1	0.402	0.075	0.342	0.088
			2	-0.402	0.075	-0.342	0.088
Data security and privacy policies	16.826	16.001	1	0.375	0.116	0.314	0.120
			2	0.177	0.140	0.245	0.138
			3	-0.552	0.116	-0.559	0.138
Existence of alternative payment	10.412	10.564	1	-0.051	0.099	-0.065	0.118
			2	0.002	0.115	0.159	0.139
			3	0.049	0.115	-0.094	0.139
Make phone o e-mail contact	10.389	8.063	1	0.364	0.081	0.255	0.087
			2	-0.364	0.081	-0.255	0.087
Information on postage and packing costs	10,408	9.312	1	0.339	0.074	0.299	0.088
			2	-0.339	0.074	-0.299	0.088
Options to reserve product	8.35	-	1	0.257	0.073	-	-
			2	-0.257	0.073	-	-
Posting customer reviews	7.182	-	1	0.220	0.079	-	-
			2	-0.220	0.079	-	-
Technical product description	-	11.271	1	-	-	0.386	0.087
			2	-	-	-0.386	0.087
Physical store distributor	-	10.628	1	-	-	0.350	0.088
			2	-	-	-0.350	0.088

The different attribute levels present similar partial utilities, except in the case of the payment methods. In pleasure trip there is a preference for paying by instalments.

In order to test whether there are significant differences in the participants' choices for the two products, and given that the samples are related, we applied the Wilcoxon signed-rank test for the seven attributes that are common to both product types and their levels. There are no significant differences in the partial utilities of the levels of the two product types, but there are differences in the relative importance of the attributes. The sum of the relative importance of the seven attributes analysed is 84.48% in the case of the trip and 78.1% for the laptop computer. In the case of the laptop, the participants consider that almost 22% of an e-retailer's total importance is derived from the provision of the technical details of the product and the existence of a physical store. However, there are differences in the importance given to the attributes. In the case of the pleasure trip, five out of the seven attributes analysed obtain higher values in this respect than for the laptop. Only the existence of alternative payment options is considered to be slightly more important than in the case of the trip.

Finally, the variables used to segment the sample were gender and previous experience of Internet purchasing. No statistically-significant differences were found in the relative importance of the attributes or in the partial utility of the levels.

5 Discussion and limitations

From the results of the initial study to determine the attributes of the profiles for the conjoint analysis, the least important attributes were design-issues -which have scarce relevance to the task [11]. However, the utilitarian attributes, such as price, product guarantee and returns policy, the security, privacy, information on how to buy, product images or technical description, achieved high selection percentages. E-retailers will need to make it easy to identify and access the variables on their websites which are most relevant to the task. Online consumers need them in order to make the decision to buy. Secondly, although the security and privacy policies are not the most important attribute in the initial study, the results of the conjoint analysis show that these are the attributes which are given the highest relative importance. The risk attached to data security and confidentiality is one of the specific arguments that non-purchasers maintain against online purchasing. Public institutions with policies to support e-commerce and the firms which sell their products and services online should then continue striving to minimise consumers' rejection of online purchasing and their concerns regarding the problem of online security. They should show the advances made in guaranteeing the privacy of personal data. Thirdly, there are differences in the relationship between product type and the most valuable attributes of a website. Thus, in the case of the laptop, the technical description of the product and the fact that the e-retailer also operates from a physical store are given a high relative importance. In fact, one of the fundamental reasons for internet users not shopping on the web is their preference for physical stores, where they can see what they are buying [33] and can gather all the technical and commercial information that they believe to be important. Companies with physical stores and online outlet have significant competitive advantage over the pure-players, for certain products at least. Consumers prefer them. Fourthly, although we have been unable to prove any differences in the respondents' preferences according to their characteristics, conjoint analysis is a methodology which provides managers with useful information which they can apply to their online design for different consumer segments. Websites could be tailored according to aspects such as the consumer's

previous experience as an online shopper [40] or age [23]. The Internet will be allows a high degree of adaptation to each client's profile, to help satisfy all of their consumer needs. These conjoint models could also be used in future investigations to identify segments which describe the Internet shopper according to characteristics that are not known a priori to the researcher [21, 3, and 37].

Finally, the limitations of this paper arise from the methodology used. The number of attributes and levels must be decided by the investigator: a conjoint analysis cannot be carried out using a high number of them, since the factorial design would produce too many profiles for the individual to evaluate.

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