A Comparison of Brand Loyalty in Online and Physical Channels: An Empirical Application to Supermarkets

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ABSTRACT

In this study some differences in brand value in online channels are examined and compared with physical channels. The arguments presented lead to two hypotheses about brand loyalty in these environments. The first is that brand loyalty will be greater in online channels and the other that this difference is greater in product categories in which sensory factors predominate (those perceived by the senses, such as touch or smell). A choice model that depends on the degree of brand loyalty is proposed (Colombo and Morrison, 1989) and the hypotheses are contrasted empirically. Using data from 2003, the degree of brand loyalty and the degree of loyalty within a category are estimated for two product categories sold in an online and physical stores of one of the main Spanish supermarket chains.

***KEYWORDS*:** brand loyalty, e-commerce, brand value, choice models, information availability and brand choice

1. INTRODUCTION

In this paper we propose to study some aspects of brand value in virtual or *online* commercial channels. Ever since the Internet began to be used for commercial purposes there has been a great deal of interest in ascertaining what differences exist between the online and traditional way of commercialising products. At first, many thought that the internet would cause an increase in competition that would lead to almost perfect competition, due to the increase in the size of markets, greater availability of information and the reduction in search costs for consumers. However, several studies soon showed that the Internet was a far from frictionless market. For instance, Brynjolfsson and Smith (2000a and 200b) analysed prices of CDs and books in online and physical channels in purchases carried out using *shopbots* (web sites that compare prices of products in different online stores) and found that prices in the internet are often higher than those in physical stores, and that the most expensive internet stores were, at the same time, those with the greatest market share (e.g. Amazon). The explanation for these facts, according to the authors, is that consumers also use the brand as a sign of reliability and reputation and that considerable consumer loyalty exists on the Internet.

Subsequently, in various studies, the effect of brand and other marketing variables on consumer choice in the Internet have been studied. Degeratu et al (2000) compare consumer behaviour in an online store and a physical one. Using purchase data from a panel of consumers in several physical supermarkets and purchase data collected from an online supermarket's web site, the effect of brand, price and promotions are compared in the two environments for three product categories. In their analysis they include an interesting aspect that allows us to explain why the differences found between the two environments depend on the product category: the role of the information available to the consumer in the brand choice process. The idea is that when sensory attributes predominate in a product category (attributes which are only perceived by the senses, such as smell or touch) the quality of information is lower in an online store and the effect of the brand is greater. On the other hand, when non-sensory attributes predominate in a product category (attributes which can be transmitted as information, for example the fat content of a margarine) the quality of information is higher in an online store and the effect of the brand is lower.

The role of information in consumer choice is an important aspect. In two articles by Alba et al (1997) and Burke et al (1992), it is seen that when consumers have less information (about the characteristics of a product) to take a decision, two things usually happen. Firstly, they grant importance to the brand (the brand, in these cases, plays a role which could be called the "halo effect" in the sense that it allows the value of the unknown attributes to be inferred). Secondly, consumers are much more likely to buy the same brand as on previous occasions, that is to say, they show greater brand loyalty. So, in situations of less information and more perceived risk, consumers minimise this by increasing loyalty. Generally, for the majority of product categories (at least those sold in supermarkets), it is more difficult to transmit information in an online store than in a physical store.

There are also other reasons for greater loyalty on the Internet. One is the fact that Internet consumers value highly the convenience and speed with which they can carry out their purchases (AIMC 2002), and so they are not willing to dedicate much time to these. One of the ways of simplifying and shortening the purchasing

process is to buy the same product as on previous occasions.
Another reason (closely related to the above) is the fact that tools exist on the Internet that allow the automisation of purchases and may increase loyalty. In the case of online supermarkets, there are usually "personal lists" or "last shopping lists" that consumers can use in order to shop almost automatically, buying always the same products.
Therefore, in summary, our intention is to investigate two questions. Firstly, to see whether loyalty is greater in purchases carried out in online channels than in physical channels. As we have seen, there are sufficient arguments in favour of this position.

Secondly, we aim to verify whether, in product categories where sensory factors predominate, the difference in loyalty in online and physical channels is greater than in categories where sensory factors are less important. This, in a way, is equivalent to showing that when there is less information in the choice process, consumers are more loyal.

In order to examine both hypotheses concerning loyalty in online and physical environments, we will use a model that explains consumer behaviour as a choice problem between several discrete alternatives, and in which loyalty plays an important role. This is the Colombo and Morrison model (1989) which is described below.

We will subsequently carry out empirical analysis using purchase data from an online supermarket and a physical supermarket. We will estimate the parameters of the model for these data to see whether they support the aforementioned hypotheses. Finally, to conclude the paper, we will mention some of the study's principal limitations and some areas for future research.

2. A BRAND CHOICE MODEL WITH BRAND LOYALTY (COLOMBO AND MORRISON, 1989)

Let us take an individual who is faced with the choice of one alternative from a possible group of N (henceforth brands). Let A_1 be his previous purchase and A_2 his current purchase. The probability that his current purchase will be j, given that his previous purchase was i (i,j=1,...,N) is $P(A_2=j/A_1=i)=P_{i,j}$ so that

$$P_{i,j}=\exp U_{i,j}/ \exp U_{i,k},\ i,j=1,...,N \qquad (1)$$

where $U_{i,j}=U(A_2=j/A_1=i)$, is the utility of an individual currently purchasing j given that he previously bought i. Let us suppose that $U_{i,k}=U_k$ when $i\neq k$, that is, that the utility to the individual of the current purchase of a different product to the one bought previously is independent of this.

We define the "free" probability of purchasing i (without considering the previous purchase) as $P(A_2=i)=\pi_i$, i=1,...,N, where

$$\pi i=\exp U_i/ \Sigma_k \exp U_k \ k=1,\ldots,N \qquad (2)$$

We now define α_i (i=1,...,N) as

$$\alpha_i= (\exp U_{i,i}-\exp U_i)/(\exp U_k+\exp U_{i,i}-\exp U_i) \qquad (3)$$

We should observe that α_i may be considered as the degree of loyalty in brand i because it is monotonous in $U_{i,i}$-U_i, that is, the greater the influence of having bought brand i previously on buying it now ($U_{i,i}$ is great), the greater are $U_{i,i}$-U_i, and $\exp U_{i,i}$-$\exp U_i$, and viceversa. If we suppose that the individuals who previously bought i can be grouped in two segments, A and B, where with $U^A_{i,i}$=Ui y $U^B_{i,i}\rightarrow\infty$, then we obtain $\alpha^A_i=0$ and $\alpha^B_i=1$.

If we now apply the above expressions, we can now rewrite the probabilities $P_{i,i}$ and $P_{i,j}$ as

$$P_{i,i}=\alpha_i+(1-\alpha_i)\pi_i \qquad (4)$$
$$P_{i,j}=(1-\alpha_i)\pi_j \qquad (5)$$

We may consider the α_i and π_j as the proportions of loyal and non-loyal customers to each brand.
On the other hand, if S_i is brand i's market share, estimated from the first purchase, then $LP=\sum_{i=1}^{N}\alpha_i S_i$ is the degree of loyalty in the market.

Estimation of the parameters α and π is carried out using the maximum likelihood method.

3. EMPIRICAL ANALYSIS

3.1. Data

We are going to conduct an empirical application of the above model in order to verify whether it supports the two hypotheses mentioned in Section 1. We will use data from one of the five leading supermarket chains in Spain, present in a large part of the country, and a pioneer in Internet sales. For reasons of confidentiality, we will omit the name of the chain.

We will use data corresponding to purchases from June to November 2003 obtained at the point of sale in the physical supermarkets and at the web site of the online store, for consumers resident in several regions of the country, principally in large towns, which is where this distribution chain is established. Internet purchases are possible in practically the same towns as those in which physical supermarkets exist. The variety and depth of product lines are similar in both types of supermarket, as are the prices and the majority of promotions.

We will use data from two product categories (at a later date we intend to generalise the study using a larger number of categories): kitchen paper and domestic alumimium foil. The reason for choosing these categories is that for one of them, kitchen paper, sensory factors that are best appreciated in the physical supermarket, such as, texture, design, thickness, size etc. predominate. In the case of the aluminium foil, however, few of these sensory atributes exist: the packaging is opaque, and so one cannot see inside, and length in metres is a non-sensory factor that can be transmitted easily via Internet.

3.2. Transition matrices

These matrices reflect the number of consumers who have bought on a certain occasion one brand and another (or the same) the next time. Each element $n_{i,j}$ is the number of consumers who purchased brand i the first time and brand j the second. From these elements we can estimate the degrees of loyalty (α) in each brand as well as in the category as a whole (LP). Tables 1 and 2 show the transition matrices for both categories in both stores.

3.3. Results of the estimation

Table 3 shows the results of the estimation of the loyalty parameters for the brands (α) and within the product category (LP) in each store and for both product categories.

It can be seen that category loyalty is greater in both categories in the online store than in the physical one (0.80 compared to 0.41 in kitchen paper and 0.96 compared to 0.79 in aluminium foil). This confirms the first hypothesis that loyalty is greater in online stores than in their physical counterparts.

Furthermore, the difference between the two store types is greater for kitchen paper, which, as we have seen, is the category with most sensory factors that are difficult to comunícate to consumers in an online store. This result confirms the second hypothesis.

4. LIMITATIONS AND FUTURE RESEARCH

At present this research is ongoing, and so there are a number of limitations and aspects to be analysed.
One of the limitations is that we have analysed only two categories. In order to generalise the results we need to study a larger number of categories in which sensory and non-sensory factors clearly predominate.

It would also be interesting to analyse the role of prices and promotions. In the supermarket chain considered here these variables are similar, but they could produce different effects in the online store than in the physical one.

Another interesting aspect to analyse is how brand loyalty varies between brands, the model allows this to be done. For instance, we could compare private brands with leading brands (in the online store private brands enjoy the additional advantage of being able to be listed separately).

There may also be other factors in play apart from sensory and non-sensory attributes which can affect the transmission of information that influences consumer behaviour in both environments. For example, an interesting area to research is whether the differences between the two store types is due to the fact that they are used by different consumer types.

To conclude, in summary, we can state the following. We have analysed brand value through the degree of brand loyalty in online and physical stores and explained this in terms of the way information is transmitted in the two store types. We have related the presence of sensory factors with the online stores' difficulty in transmitting information. Finally, we have confirmed the two hypotheses put forward empirically.

Table 1. Transition matrices. Kitchen paper.

Online supermarket					Physical supermarket					
		Second purchase occasion				Second purchase occasion				
		Private label	Colhogar	Scottex		Bols	Private label	Colhogar	Renova	Scottex
First purchase occasion	Private label	70	6	0	Bols	3	10	5	0	0
	Colhogar	5	38	1	Private label	3	140	52	1	18
	Scottex	1	1	3	Colhogar	5	49	128	2	14
					Renova	0	1	1	1	1
					Scottex	2	10	18	2	25

Table 2. Transition matrices. Aluminium foil

Online supermarket				Physical supermarket			
		Second purchase occasion				Second purchase occasion	
		Albal	Private label			Albal	Private label
First purchase occasion	Albal	10	2	First purchase occasion	Albal	23	9
	Private label	0	39		Private label	10	136

Tabla 3. Results of the estimations

Kitchen paper						
	Online store			Physical store		
Brand	Alfas	Pis	Market share	Alfas	Pis	Market share
Private label	0.86	0.43	0.61	0.46	0.36	0.44
Colhogar	0.73	0.50	0.35	0.42	0.39	0.40
Scottex	0.57	0.07	0.04	0.32	0.17	0.12
Bols				0.12	0.05	0.04
Renova				0.23	0.03	0.01
Degree of loyalty in the category		0.80			0.41	
Domestic aluminium foil						
	Online store			Physical store		
Brand	Alfas	Pis	Market share	Alfas	Pis	Market share
Private label	1.00	1	0.76	0.87	0.47	0.82
Albal	0.83	0	0.24	0.41	0.53	0.18
Degree of loyalty in the category		0.96			0.79	

Note. Coefficients are significant at 10%

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