Attention to Online Channels across the Path to Purchase: An Eye-Tracking Study

Monica Cortinas[*,a], Rafael Cabeza[b], Raquel Chocarro[c], Arantxa Villanueva[b]

[a] *Public University of Navarra - Institute for Advanced Research in Business and Economics,+34948169895, Campus de Arrosadía, Pamplona, 31006, Spain*
[b] *Public University of Navarra-Department of Electrical and Electronic Engineering, Campus de Arrosadía, Pamplona, 31006, Spain*
[c] *Public University of Navarra -Department of Business Management, Campus de Arrosadía, Pamplona, 31006, Spain*

Abstract

These days, consumers display what is known as omnichannel behaviour; that is, the combined use of digital and physical channels providing them with multiple points of contact with firms. This paper uses eye-tracking techniques to observe how customer perceptions of digital channels vary across different purchasing tasks. The experimental design comprises four purchasing tasks in four different product categories, and measures attention to the website and time spent on each task along with several control variables. The results show that shoppers attend to more areas of the website for purposes of website evaluation than for performing purchase tasks. The most complex and time-consuming task for shoppers is the assessment of purchase options. The actual purchase and post-purchase tasks require less time and the exploration of fewer areas of interest. Personal involvement, also plays a role in determining these patterns by increasing attention to the product area.

Keywords

Customer journey, purchase task, eye-tracking, channel perception, experimental design

Acknowlegements

We acknowledge financial support for this research from the Spanish Ministry of Education and Science: Project ECO2015-65393-R

*Corresponding Author

Email addresses: `mcortinas@unavarra.es` (Monica Cortinas), `rcabeza@unavarra.es` (Rafael Cabeza), `raquel.chocarro@unavarra.es` (Raquel Chocarro), `avilla@unavarra.es` (Arantxa Villanueva)

Attention to Online Channels across the Path to Purchase: An Eye-Tracking Study

Abstract

These days, consumers display what is known as omnichannel behaviour; that is, the combined use of digital and physical channels providing them with multiple points of contact with firms. This paper uses eye-tracking techniques to observe how customer perceptions of digital channels vary across different purchasing tasks. The experimental design comprises four purchasing tasks in four different product categories, and measures attention to the website and time spent on each task along with several control variables. The results show that shoppers attend to more areas of the website for purposes of website evaluation than for performing purchase tasks. The most complex and time-consuming task for shoppers is the assessment of purchase options. The actual purchase and post-purchase tasks require less time and the exploration of fewer areas of interest. Personal involvement, also plays a role in determining these patterns by increasing attention to the product area.

Keywords

Customer journey, purchase task, eye-tracking, channel perception, experimental design

Introduction

Analysis of the online customer experience is becoming increasingly important; firstly, because the web is a very important sales medium in virtually all sectors, and, secondly, because it has become a major communication and service distribution channel in an omnichannel environment (e.g. Verhoef, Kannan, & Inman, 2015). Consumers engage in increasingly complex behaviour along the so-called customer journey, during which they use a combination of contact points in order to meet their needs and wants (Cassab & MacLachlan, 2009). A recent survey of 46,000 customers of a US retailer revealed that the vast majority (73%) use a combination of physical and digital shopping channels (Sopadjieva, Dholakia, & Benjamin, 2017). Another study of the Spanish fast-fashion sector, conducted in 2016, showed that 60% of its customers are omnichannel shoppers (Chocarro, Cortinas, & Elorz, 2018). Thus, the purchase process, traditionally studied as a linear phenomenon, is now acknowledged as an increasingly complex and unpredictable "path–to-purchase", and analysis of the customer experience along that path is considered more important than ever (Beck & Rygl, 2015).

A major part of retailers' activities are directed at capturing the customer's attention (Puccinelli et al., 2009). Analysis of the attention-capture process in the various retail channels, and more specifically the online retail channel, at various points along the path to purchase can help to enhance the customer's experience by adapting each channel to its various potential functions. The customer experience is an internal and subjective process (Meyer & Schwager, 2007), and is therefore difficult to assess by means of declarative statements.

This paper, therefore, proposes the use of an observational technique, known as eye-tracking, which, as suggested by Lemon & Verhoef (2016), can provide a useful tool for exploring the customer experience along the customer journey. Eye tracking systems have been used for decades in the fields of psychological and marketing research (Majaranta, 2011) because gaze is one of the main attention indicators (Wedel & Pieters, 2008). Eye-tracking technology is especially useful for measuring attention in information-rich digital environments (Wedel, 2015). For example, Velásquez (2013) uses eye-tracking devices for more accurate identification of website key objects than is possible by means of web usage data mining.

Eye-tracking systems enable us to infer to which part of a surface of interest, such as a computer screen, the user's gaze is directed (Duchowski, 2017). These systems require specific hardware involving cameras and infra-red light. Thus, using computer vision software, it is possible to estimate gaze location. The system requires calibration or prior training during which the subject is presented with a set of points on a 3x3 or 4x4 grid. Following calibration, eye-tracking can commence and fixations estimated.

In customer path-to-purchase analysis, different stages are often revealed (Neslin et al., 2006): the pre-purchase stage during which consumers seek and analyze information to enable decision-making; the purchase stage, where the consumer makes the purchase; and the post-purchase stage, which involves the use of after-sales services or posting product evaluations or reviews. Consumers' aims vary in nature and complexity from one stage to another (Neslin et al., 2006; Verhoef, Neslin, & Vroomen, 2007) and their online behaviour and perceptions change according to the desired objective (Leuthold, Schmutz, Bargas-Avila, Tuch, & Opwis, 2011). Thus, the specific purpose of this study is to use observational techniques to examine how the stage in the purchase process, a so-called top-down factor (Wedel, 2015), affects consumer attention in digital environments. More specifically:

1. The effect of the stage of the purchase process on the elements of interest on a website: does the stage of the purchase process influence the areas of the website to most attention is given? Which areas of the website draw most attention at each stage?
2. The effect of the stage of the purchase process on visual exploration: what is the nature of the website exploration pattern? Does the type of purchase task affect how website information is processed?
3. The effect of the stage of the purchase process on exploration time: How much exploration time is required to complete the task? Do complex

tasks require longer exploration times and more complex scan paths than required for simple tasks?

The next section describes the conceptual framework and presents some propositions with respect to these research objectives. It is followed by sections presenting the experimental design, the methodology, the results and a discussion of the findings, and, the paper ends with some concluding remarks.

Conceptual framework

The literature has used the term atmospherics to refer to the elements of the shopping environment that affect the consumer's purchase process (Kotler, 1973). Turley & Milliman (2000) offer a review of over 60 studies linking consumer behaviour to point-of-sale atmospherics, including a diversity of factors relating to inner and outer store appearance, store design, atmosphere, layout, colours and sounds, etc.

Analogously, online point-of-sale (website) atmospherics are also found to affect web-surfing behaviour (Richard, 2005). Thus, web atmospherics are "...the conscious designing of Web environments to create positive affect and/or cognitions in surfers in order to develop positive consumer responses" (Dailey, 2004). Eroglu, Machleit, & Davis (2001) present a conceptual framework for exploring the effect of online store atmospherics using a stimulus-organism-response (S-O-R) model. S-O-R models have long been used in research on consumer behaviour and on the influence of environmental effects (Donovan & Rossiter, 1982; Jacoby, 2002). These models represent a process by which a given external stimulus triggers an emotional response in an organism (consumer) who reacts by either approaching or avoiding the stimulus. The model designed by Eroglu et al. (2001) classifies stimuli as task-relevant (product descriptions, prices, service conditions, product images, etc.) or task-irrelevant (colours, outlines, fonts, animations, etc.) and takes into account the consumer's purchase involvement. Richard (2005) also proposes an S-O-R model, which includes exploration behaviour and website involvement among the cognitive responses of the individual. Richard (2005) also considers the consumer's product category involvement as a key mediator. Among highly task-relevant stimuli there are two distinct types of element: content and design. According to Huizingh (2000) "... content refers to the information, features, or services that are offered in the Web site; design, to the way the content is made available for Web visitors".

The literature also shows how customers' online behaviour varies according to the task they are engaged in. Studies reflecting variation in online behaviour include Shim, Eastlick, Lotz, & Warrington (2001) on the pre-purchase stage; Chocarro, Cortiñas, & Villanueva (2013) on the channel choice stage; Chen, Hsu, & Lin (2010) on purchase intention formation; McDowell, Wilson, & Kile (2016) on purchase decisions; and Kim, Galliers, Shin, Ryoo, & Kim (2012) and Chocarro, Cortinas, & Villanueva (2015) on repeat purchase intention and loyalty formation in the post-purchase stage. The analyzed responses range from purchase intentions (Hausman & Siekpe, 2009; Shim et al., 2001), through various attitudinal responses (Hasan, 2016; Herrando, Jimenez-Martinez, & Hoyos, 2018), to the concept of state of flow (Hoffman & Novak, 2009) and value (Hasan, 2016). For task classification, there are various criteria, such as complexity (Wang, Yang, Liu, Cao, & Ma, 2014), information search versus purchase (Shim et al., 2001), the stage of the purchase process (Rowley, 2000). In the multichannel shopping context, the complexity of task categorization is greater (Beck & Rygl, 2015), given that a specific channel may be used in combination with others for the completion of a single purchase task, as is the case with web-rooming and show-rooming behaviour (Verhoef et al., 2015). Neslin et al. (2006) present a conceptual framework accommodating these perspectives and including three distinct main stages (search, purchase and after-sales) through which the consumer progresses after initial need-recognition, and during which he or she develops perceptions and preferences regarding the available channels. Consumers' channel preferences at each stage will also be influenced by their perceptions and preferences with respect to other options. It is also well documented in the literature that these tasks imply different degrees of cognitive burden (Bennett, Perrewé, Kane, & Borgatti, 2017) and that more the complex tasks take longer to complete (Wang et al., 2014). Our first proposition, therefore, is:

Proposition 1. Website task completion time varies with task complexity, being longer for more complex tasks such as website evaluation or the evaluation and selection of purchase options than it is for simpler tasks, such as actual purchase once the evaluation and search stages are complete.

Channel preference and perception formation, however, will be further influenced by retail channel atmospherics. Puccinelli et al. (2009) note that consumers' perceptions of retail environments can vary with the aim they are pursuing at a given moment. The online shopping environment includes all the features of a given website. However, consumers may ignore features they do not find task-relevant. Drèze & Hussherr (2003) show how people ignore advertising banners when navigating the Net. Van Duyne, Landay, & Hong (2003) define four key features of web design patterns: navigation area, brand content area, product content area and related links, the first three being the most important features of an e-commerce site. The layout and appearance of these areas are included in the design features, while the number of menu levels, depth of description, and others, are content features (Huizingh, 2000; Katz & Byrne, 2003); and both types are key influencers of website quality perception (Al-Qeisi, Dennis, Alamanos, & Jayawardhena, 2014). These content features are among the website-quality assessment tools identified and developed by IT and marketing researchers (Chiou, Lin, & Perng, 2010). However, as noted by Dedeke (2016), website quality measurements usually integrate evaluations of website content features with others, such as speed and ease of use, or security, thereby complicating the task of analyzing their individual impact on consumer perceptions through the different stages of the path to purchase.

Eye tracking metrics are particularly useful for measuring perceptive processes. The use of eye-tracking for attention measurement is nothing new (Wedel, 2015). It has been satisfactorily used for this purpose in contexts such as driving (Crundall & Underwood, 2011), high-performance sport (Kredel, Vater, Klostermann, & Hossner, 2017), etc. Eye-tracking tools have been used to study cognitive processes (Reutskaja, Nagel, Camerer, & Rangel, 2011), and attention to in-store (Pieters & Wedel, 2004) and online (Drèze & Hussherr, 2003; Lee & Ahn, 2012) advertising stimuli. For a review, see Wedel (2015) and Wedel & Pieters (2008). The use of eye tracking equipment to evaluate Web usability with a view to enhancing the user experience also has a long history (Li, Sun, & Duan, 2005). In a similar vein, the research on so-called top-down factors includes studies of how perceived appeal differs with factors such as gender or age (Djamasbi, Siegel, & Tullis, 2010; Zaharia, Kauke, & Hartung, 2017), and task complexity (Leuthold et al., 2011; Wang et al., 2014). The research on so-called bottom-up factors includes Leuthold et al. (2011) on the impact of menu design and Wang et al. (2014) on the influence of website complexity.

Website attention analysis has identified various areas of interest in a website (AOIs), starting with the header, which serves to define intention and content (Holzschlag, 1998) and usually includes at least the name of the firm and, often, contact details. The header presents the company identity and brand logo. Huizingh (2000) refers to this and the product area as "marketing information areas". The usefulness of the information will depend on the goal of the user, since the company's identity may be irrelevant when navigating for purposes other than brand assessment. Thus, our second proposition states that:

Proposition 2. The header draws more attention and has a greater attention retention capacity and appeal when the user's goal is website evaluation than when it is to carry out the tasks leading to purchase.

Next comes the key feature of a web page, the content, which, in B2C e-commerce sites, is located in the product area (Van Duyne et al., 2003). Information presentation in this area is critical for success (Flavián, Gurrea, & Orús, 2010). According to Badre (2002), consumers expects products to be presented in much the same way as in a store, therefore the function and layout of the content area are similar to those of a shop window. As in the case of the header, however, attention levels in this area depend on the stage the consumer has reached in the purchase process, since product information is more necessary when evaluating and selecting options and for purchase task. Our third proposition, therefore, states as follows:

Proposition 3. The product area draws more attention and has greater attention retention capacity and appeal when the user's goal is to evaluate the options and make a purchase.

The last key content feature is the navigation menu linking the user to the various internal pages of the website (Yu & Roh, 2002). This menu often has links to transactional information (Huizingh, 2000), enabling access to the details of payment, shipping, return and other company policies. This sort of information may be more relevant at certain points in the transaction process and during overall evaluation of a specific site and less relevant for tasks relating to the evaluation of options. Thus, our fourth and last proposition states that:

Proposition 4. The service navigation menu commands more attention and has greater attention-grabbing and retention capacity during general exploration tasks and post-purchase tasks than it does during product evaluation and purchasing tasks.

Research design

Research proposals

We test the above propositions by means of an experimental design. This methodology enables examination of the effects of the factor that concern us (stage in the purchase path) on the dependent variables (indicators of the perceptive process) after isolating the effects of the control variables. The design considers three different levels of the purchase process: the pre-purchase stage (choosing between options), the purchase stage (locating the chosen option and adding it to the shopping cart) and the after-sales stage (tracking order status). An additional task, website evaluation, while not directly purchase-oriented, is incorporated for control purposes.

The dependent variables of interest are time spent on the task and attention to each area of the website, both of which are measured using observational (behavioural) rather than declarative methods. Time spent on the task is measured by means of an embedded function on website which registers the time elapsed from completion of page download to first click, indicating task completion. Attention to the website is measured using eye-tracking equipment. As well as the above-mentioned time spent on task, we also include attention indicators such as the number of gaze fixations on each area of interest (to show relative importance of each area) and transfers between AOIs (exploration pattern). Data of transitions between areas for each task is used to create individual AOI transfer matrices.

However, the design also needs to include other control variables that might affect attention. A first example would be the product category, which can affect both time spent completing the task and attention paid to the web page. This effect is mitigated by including four different product categories with different degrees of risk and including both search and experience products (Mitra, Reiss, & Capella, 1999). The four categories are sports shoes, mobile phones, ball-point pens and hard disks. The design also includes another control variable, whose importance was highlighted in the conceptual framework, the subject's category involvement and brand sensitivity, which might have a moderating effect on the importance of company identity.

Finally, subject characteristics, such as online shopping experience, and demographics are included for control purposes, although there are other unobservable subject characteristics that could affect attention and task completion time. As an additional control mechanism, therefore, an intra-subject research design was selected in which each subject completes the four tasks. This has the advantage of controlling individual effects but implies potential bias from the learning effect which appears as the subjects progress through the required tasks (Gentile, Roden, & Klein, 1972). This learning effect is controlled for by randomly assigning the subjects to randomly-formed task/category pairs, such that each subject completes all four tasks for all four categories, in what is ultimately a 4(task)x4(category) intra-subject design.

Implementation and measurement

The above experimental design was implemented by creating a simulated web store for each of the four product categories. Such simulation is not new to this type of research (Leuthold et al., 2011; Wang et al., 2014) and, although it reduces the degree of realism, it enables stricter control of other effects that might bias the results. The same layout is used for all four stores, with variation in the colours but in no other features so as to avoid other potential biases. It is a natural-looking e-commerce website layout enabling unambiguous location of the three areas of interest (AOI) as found in most countries worldwide (Bernard & Sheshadri, 2004). Thus, the first area of interest, the header showing the company identity, appears centre top and has a menu with contact details, the "Home" button on the left and the shopping cart on the right. The second area of interest, the product offer, occupies centre-screen below the header. It has the appearance of a shop-window displaying images of the goods, with prices and add-to-cart buttons below. The third area of interest, services, appears on the left below the header. Images of all four web stores are provided in Annex 1.

As well as the websites, the experimental design includes an online platform (Qualtrics)[1]. The codified online questionnaire is designed to randomly assign visitors to four task-category pairs keeping task/category quotas balanced. The questionnaire is linked to the four web stores such that, when the task for a certain category comes up on screen and the subject presses the store access button, the time spent in the store up to the first click is registered and the subject returns to the questionnaire. Online purchase frequency measures for each category are taken prior to each task and category involvement and attribute sensitivity data are collected after task completion. The subject's individual characteristics are collected once all four tasks have been completed. The full questionnaire is provided in Annex 2.

Subjects' level of attention across task types is measured by means of purpose-designed eye-tracking hardware comprising cameras and infra-red light, as already described. The specific choice of hardware for this study is The Eye Tribe Tracker. According to its manufacturers, The Eye Tribe Tracker has an average accuracy of 0.5º, a spatial resolution of 0.1º (rms) and an average frame rate of 30 Hz. After calibration, the subject accesses the questionnaire and commences the tasks. The system monitors the subject's gaze throughout the trial and registers eye fixations according to a specified spatial dispersion criterion. Once the trial is complete, the gaze position coordinates and time patterns across the four tasks are taken and the subject's fixation times are recorded and classified by AOI and type of task.

This information is completed with declarative data collected through the questionnaire (Annex 2). The individual attention patterns obtained by eye-

[1] https://www.qualtrics.com/

tracking are linked to the declarative data from the questionnaire by a unique code generated by Qualtrics for each questionnaire. A common time variable linking the online questionnaire instrument with the exploration activity on each website is also generated.

Fifty-eight subjects were recruited among students in the fourth year of a business administration and management degree and invited to the laboratory where data collection was to take place. Data collection, including eye tracker instrument calibration, questionnaire completion and associated tasks took an approximate total of 15 minutes per person. Subjects were accompanied by a researcher throughout this process.

Given the sample profile, the subjects were highly homogeneous with regard to age (mean age 24.8, with a standard deviation of 4.7) and occupation (94% were full-time students). 60% of the sample were women. Table 1 gives a summary of the descriptive data for ease with online information-seeking and purchase processes, and category involvement indicators.

——————— Insert Table 1 around here ———————

Sports shoes and mobile phones are both high-interest products. Although it is the least known, the hard disk is a high-importance and high-interest product due to its price. The opposite is true of ball-point pens, which are low-importance and low-interest products. The mobile phone is the category that generates most interest. The values for ease with online information seeking and online shopping are high with very low standard deviation.

Method of analysis

Through the combined analysis of task completion times, eye-tracker readings and statements obtained through the questionnaire, it is possible to draw conclusions about gaze patterns on an e-commerce site and the time and effort required to explore it and see if and how they vary across task types.

All the models include the required tasks as explanatory variables; the category and the subject's involvement with it as control variables. Involvement is constructed through factor analysis of the three indicators included in the questionnaire for each of the four categories. The Cronbach's Alpha scale reliability coefficient is 0.69 for the sports shoes category, 0.81 for the mobile phones, 0.77 for the ball-point pens, and 0.73 for the hard disks (Cronbach, 1951).

The intra-subject experimental design, by which each subject performs four tasks, calls for a method of analysis that takes into account intra-subject correlation; therefore fixed effects models are used in all cases (Pinheiro & Bates, 2001). The model to be estimated for task completion time takes the following form:

Model 1

$$y_{ij} = \alpha_i + \sum_{j=1}^{4} \beta_j Task_{ij} + \sum_{z=1}^{4} \gamma_z Cat_z + \rho_1 Inv_i + \rho_2 Search_i + \rho_3 Purchase_i + e_{ij} \quad [1]$$

$$\alpha_i = \alpha + u_i \quad [2]$$

where:

y is task completion time in seconds

i is the subject, with $i = 1....58$

j is the task subindex and the dummies are 1: exploration ($Task_1$), 2: information seeking ($Task_2$), 3: purchase ($Task_3$) y 4: post purchase ($Task_4$)

α_i is the constant term for the model, which varies with the subject

β_j are the parameters for the effect of the task relative to the control 0 (website exploration)

γ_z: parameters for the category effect, where the dummies are Cat_1: sports shoes, Cat_2: mobile phones, Cat_3: ball-point pens, Cat_4: hard disks

Inv_i: subject i's involvement with the category in which the task is performed

$Search_i$: subject i's ease with online information seeking

$Purchase_i$: subject i's ease with online shopping

ρ_1 parameter for subject's level of involvement with the category

ρ_2 parameter for subject's level of ease with online information seeking

ρ_3 parameter for ease with online shopping

e_{ij} and u_j are the estimation error terms

We apply a linear mixed-effects estimation in R (v3.4.4) (Bates, Mächler, Bolker, & Walker, 2014).

Next, three equations are estimated for $k = 1, 2, 3$ to measure the level of attention to the three areas of interest. The equations to be estimated are

Model 2

$$y_{ijk} = \alpha_{ik} + \sum_{j=1}^{4} \beta_{jk} Task_{jk} + \sum_{z=1}^{4} \gamma_{zk} Cat_z + \rho_{1k} Inv_i + \rho_{2k} Search_i + \rho_{3k} Purchase_i + e_{ijk} \quad [3]$$

$$\alpha_{ik} = \alpha + u_i \text{ para } k = 1, 2, 3 \quad [4]$$

where:

y is the total number of fixations made by subject i while engaged in task j en AOI k

i is the subject where $i = 1....58$

j is the task subindex where the dummies are 1: exploration ($Task_1$), 2: information seeking ($Task_2$), 3: purchase ($Task_3$) and 4: after sales ($Task_4$)

k is the zone of interest, where 1 is the header, 2 is the side menu, and 3 is the content zone

α_k is the constant term for the exploration zone, which varies with the subject and the AOI

β_{jk} are the parameters for the task effect in AOI k

γ_{zk}: parameters for the category and AOI effects, where the dummies are Cat_1: sports shoes, Cat_2: mobile phones, Cat_3: ball-point pens, Cat_4: hard disks

Inv_i: subject i's involvement with the category in which the task is performed

$Search_i$: subject i's ease with online information seeking

$Purch._i$: subject i's ease with online shopping

ρ_{1k} parameter for the subject's category involvement in AOI k

ρ_{2k} parameter for ease with online information seeking

ρ_{3k} parameter for ease with online shopping

e_{ijk} and u_j are the error terms

The three equations, one for each AOI, are estimated as linear mixed-effects models R (v3.4.4) (Bates et al., 2014).

Finally, the dependent variable in the exploration pattern models is the probability of transfer between AOIs in the individual transfer matrix, where the minimum and maximum probabilities are 0 and 1, respectively, which means that a linear model is inadequate, so mixed effects logistic regression is used instead (Agresti, 2003).

The models in this case use the same independent variables as in the previous cases, but each probability of transfer between AOIs is expressed as:

Model 3

$$Prob(y_{ij} = 1|X_{ij}) = \frac{exp(b_0 + b_{1j}X_{1ij} + ... + b_{zj}X_{ijz})}{1 + exp(b_0 + b_{1j}X_{1ij} + ... + b_{zj}X_{ijz})} \quad [5]$$

where:

$Prob(y_{ij} = 1|X_{ij})$) is the probability of subject i's attention relocating from one zone to another in task j, subject to all the variables.

Results and discussion

Model 1. Exploration time

——————— Insert Figure 1 around here ———————

Figure 1 shows the box plots for completion time per task. The observed differences between median completion times across tasks confirm expectations and their significance is estimated through equations [1] and [2] (results shown in Table 2).

——————— Insert Table 2 around here ———————

The results suggest that task completion time varies considerably according to the desired goal. Thus, information-seeking takes significantly longer than exploration, while the two simpler tasks, purchase and after sales, take significantly less time than either of the aforementioned.

With respect to the category effect, it should first be noted that no less time is spent in the last two categories (ball-point pens and hard disks) than in the first (sports shoes), which suggests that there are no serious problems deriving from the learning effect in this design. The only significant effect, which is found in the mobile phone category, can be interpreted as the result of its being the highest-interest category in average terms. Finally, the observed effect for ease with online information seeking and online shopping is close to zero, possibly due to the high homogeneity of the sample in this respect.

Model 2. Attention by zones

Differences in levels of attention across the various zones of the website are analyzed by aggregating all of each subject's fixations on the first zone, labelled zone A (header and upper menu), on zone B (service menus) and zone C (products). Given the size differences between zones, total fixations are weighted by the relative surface area of the zone and by the subject's total number of fixations on it. Figure 2 offers a visual representation of the results and Figure 3 shows the numerical distribution of fixations per zone, per task.

———— Insert Figure 2 around here ————

———— Insert Figure 3 around here ————

Observation of the graphs shows obvious differences in the zone exploration patterns across tasks. Zone A, which relates to brand identity, presents fewer fixations than the other two zones and only receives higher attention during the exploration task. The service menu zone (zone B) presents more fixations during the post-purchase task and fewer during exploration, while the product zone (zone C) draws more attention during the options evaluation and purchase tasks. Figure 3 depicts fixations per zone among the subject's total fixations. It can be seen that the patterns across tasks remain unaltered but the relative importance of the product zone shows up more clearly.

These differences are statistically tested while controlling for product category and individual characteristics, by estimating the model shown for equations 3 and 4 (results displayed in Table 3).

————- Insert Table 3 around here ————-

The first three columns after the row names show the parameters for the fixations on zone A, which show it to be more important in the website exploration tasks (base task) than in the purchase-related tasks, particularly the actual purchase. Zone B, the menu zone, is much more important in post-purchase tasks, although it also draws a greater number of fixations during exploration tasks than during options evaluation and purchase; while zone C, in line with expectations, is the focus of attention during both options evaluation and the purchase task.

Regarding the effects of control variables, although the zone A attention patterns show no significant differences across categories, the level of attention to the services menu (third, fourth and fifth columns) is significantly higher in the sports shoes category (which takes first place) than in the penultimate category (ball-point pens), which could be an indication of a learning effect in this zone. In this case, the origin of the differences cannot be identified. In the product zone (last three columns), the only significant effect is the higher level of attention found in the ball-point pen category. There are no observable effects from category involvement or ease with the online environment, except in relation to the level of attention paid to the header where the effect of ease with online search online is significant at the 5% level and in relation to the level of attention paid to menu zone, where the effect of ease with online shopping is significant at the 5% level.

Model 3: Exploration pattern

————- Insert Figure 4 around here ————-

Exploration levels and patterns are analyzed by calculating the between-zone transfer probability matrices (Gehrer, Schönenberg, Duchowski, & Krejtz, 2018) shown in Figure 4, where the diagonal indicates the probability of fixation remaining in a given zone, while the cells above and below the diagonal indicate the probability of between- zone transfers during each task. Overall, it can be seen that the probability of transfer is highest during exploration, lowest in the post-purchase stage, and not very high during the search and purchase stages, except in the content zone. The diagonals in all four matrices indicate the expected effects, except in the case of the post-purchase task, where, although the service menus in zone B show, as expected, the highest probability of attention retention (0.484), retention is also high (0.370) in content zone C. This effect may be due to the interest generated by the content zone, where the product information is richer and more varied and includes images, which have greater attention-grabbing capacity than text (e.g. Lohse & Rosen, 2001; Hausman & Siekpe, 2009).

As supplementary material, we provide slow-motion video images of subjects' fixation patterns during the various tasks. For example, the exploration video shows how subjects transfer their attention between the three AOIs, beginning in the product zone, before moving to the header and finally to the services menu. In the purchase task, however, (the required product is third in the bottom row) after a brief exploration of the header and side menu, the subject's attention fixates on the product zone until the required product is located (purchase task video). See also the two example videos for the information-seeking and post-purchase tasks.

———- Insert Table 4 around here ———-

Table 4 shows the model estimates for transfers from zone A. The first model shown is for the probability of remaining in zone A, which is found to be higher during exploration than during the other tasks. Across categories, the upper menu has less attention-retaining capacity in the ball-point pen category, possibly due to this being a low-interest product. In terms of transfer probabilities, there is a greater chance of returning to the header from the menu zone during the exploration stage than during either of the purchase tasks. Differences are observed with respect to the probability of returning from zone C, where the chances of attention shifting back to the header are greatest during exploration, given that, once the product or menu zone has been reached, the header is no longer task-relevant.

———- Insert Table 5 around here ———-

The models for zone B in the first three columns of Table 5 show that the probability of prolonged fixation on this zone is much higher during the post-purchase tasks and much lower during purchase and evaluation. The high cross-category variation observed in relation to this zone might indicate a learning effect. This is one of limitations of this type of experimental design, which precludes testing of individual category effects. Category involvement, meanwhile, negatively influences the attention-retaining capacity of zone B: subjects with higher category involvement are more likely to switch from zone B to more category-related zones. The capacity of this zone to draw attention away from the header is equal across the exploration and post-purchase tasks and lower in the evaluation and purchase tasks. With regard to the last three columns, the chances of this zone drawing attention away from the content zone are very slight, with no significant cross-task variance, and the signs are as expected.

————- Insert Table 6 around here ————-

Finally, the product zone (zone C) has higher attention-retaining capacity during the options evaluation and purchase tasks, and less during the post-purchase task, although, even then, it plays an important role, as observation has shown, and fixation probability is higher during the associated tasks. Here, also, a category effect is observed. It could be due to learning, but also to other effects, since the highest value is associated with the pens, which are third in the presentation sequence. Involvement also has a positive effect, as reflected by the longer fixation durations observed in this zone. Its capacity to draw attention away from zone A is higher during exploration and lower during the post-purchase stage, as could be expected, while the capacity to attract attention away from zone C shows no cross-task variation.

Concluding remarks

This paper contributes to the analysis of the online shopping experience in an omnichannel environment by exploring cross-task variation in online shoppers' attention patterns. The study uses an intra-subject experimental design and a combination of observational (times, fixations and transfers) and declarative measures (involvement and ease with online information seeking and online shopping).

The analysis shows that time-spent values and fixation values in all zones are higher and between-zone attention transfers are more numerous when subjects are engaged in exploring the website. Higher time-spent values are also found when subjects are evaluating their options, but fixations are concentrated in the most task-relevant zone, i.e., the product zone. Subjects' attention patterns when purchasing the selected option are similar to those observed when they are seeking information, although the time-spent values are lower, because the task is less complex. Finally, the post-purchase task is associated with low time-spent values and high fixation on the relevant menu; but attention transfer is more frequent, due to stimuli from other zones.

Category involvement also affects these patterns. Higher involvement increases attention to the product area. No noteworthy variation relating to ease with online information seeking and online shopping online is observed, possibly because of the homogeneity of the sample in this respect. This might provide an interesting line for future research.

Another possibility for future research might be to explore variation relating to product-category characteristics, such as complexity and whether sensory or non-sensory (Trijp, Hoyer, & Inman, 1996) attribute evaluation is involved. Although our experimental design is not suited to measuring category effects, the observed signs of variation relating to the degree of product-category interest point to another potentially fruitful line of research.

Managers could take advantage of our results when trying to develop and omnichannel strategy. For example, after sale visits to the webpage are an opportunity to draw attention to new stimuli, as our results show that the attention transfer to other zones is greater in this stage. Also, they should concentrate on the product content zone when trying to develop brand image as this area is the main focus of attention for all tasks.

References

Agresti, A. (2003). *Categorical data analysis* (Vol. 482). John Wiley & Sons.

Al-Qeisi, K., Dennis, C., Alamanos, E., & Jayawardhena, C. (2014). Website design quality and usage behavior: Unified theory of acceptance and use of technology. *Journal of Business Research*, *67*(11), 2282–2290. https://doi.org/10.1016/j.jbusres.2014.06.016

Badre, A. (2002). *Shaping Web usability : interaction design in context* (p. 276). Addison-Wesley.

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2014). Fitting Linear Mixed-Effects Models using lme4, (1). https://doi.org/10.18637/jss.v067.i01

Beck, N., & Rygl, D. (2015). Categorization of multiple channel retailing in Multi-, Cross-, and Omni-Channel Retailing for retailers and retailing. *Journal of Retailing and Consumer Services*. https://doi.org/10.1016/j.jretconser.2015.08.001

Bennett, J., Perrewé, P. L., Kane, G. C., & Borgatti, S. P. (2017). Management information systems research center, university of minnesota, *35*(4), 1063–1078.

Bernard, B. M., & Sheshadri, A. (2004). Preliminary Examination of Global Expectations of Users' Mental Models for E-Commerce Web Layouts. *Usability News*, *6*(2), 1–9.

Cassab, H., & MacLachlan, D. L. (2009). A consumer-based view of multi-channel service. *Journal of Service Management*, *20*(1), 52–75. https://doi.org/10.1108/09564230910936850

Chen, Y. H., Hsu, I. C., & Lin, C. C. (2010). Website attributes that increase consumer purchase intention: A conjoint analysis. *Journal of Business Research*, *63*(9-10), 1007–1014. https://doi.org/10.1016/j.jbusres.2009.01.023

Chiou, W. C., Lin, C. C., & Perng, C. (2010). A strategic framework for website evaluation based on a review of the literature from 1995-2006. *Information and Management*, *47*(5-6), 282–290. https://doi.org/10.1016/j.im.2010.06.002

Chocarro, R., Cortinas, M., & Elorz, M. (2018). *Omnichannel Behaviour. Definitions and Covariables*. https://doi.org/10.13140/RG.2.2.13371.52004

Chocarro, R., Cortinas, M., & Villanueva, M. L. (2015). Customer heterogenity in the development of e-loyalty. *Journal of Research in Interactive Marketing*, *9*(3). https://doi.org/10.1108/JRIM-07-2014-0044

Chocarro, R., Cortiñas, M., & Villanueva, M. L. (2013). Situational variables in online versus offline channel choice. *Electronic Commerce Research and Applications*, *12*(5), 347–361. https://doi.org/10.1016/j.elerap.2013.03.004

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297–334. https://doi.org/10.1007/BF02310555

Crundall, D., & Underwood, G. (2011). Visual attention while driving: measures of eye movements used in driving research. In *Handbook of traffic psychology* (pp. 137–148). Elsevier.

Dailey, L. (2004). Navigational web atmospherics: Explaining the influence of restrictive navigation cues. *Journal of Business Research*, *57*(7), 795–803. https://doi.org/10.1016/S0148-2963(02)00364-8

Dedeke, A. N. (2016). Travel web-site design: Information task-fit, service quality and purchase intention. *Tourism Management*, *54*, 541–554. https://doi.org/10.1016/j.tourman.2016.01.001

Djamasbi, S., Siegel, M., & Tullis, T. (2010). Generation Y, web design, and eye tracking. *International Journal of Human Computer Studies*, *68*(5), 307–323. https://doi.org/10.1016/j.ijhcs.2009.12.006

Donovan, R. J., & Rossiter, J. R. (1982). Store Atmosphere: An Environmental Psychology Approach. *Journal of Retailing*, *58*(1), 34. https://doi.org/Article

Drèze, X., & Hussherr, F. X. (2003). Internet advertising: Is anybody watching? *Journal of Interactive Marketing*, *17*(4), 8–23. https://doi.org/10.1002/dir.10063

Duchowski, A. (2017). *Eye Tracking Methodology Theory and Practice Second Edition* (p. 125). Springer. https://doi.org/10.1145/1117309.1117356

Eroglu, S. A., Machleit, K. A., & Davis, L. M. (2001). Atmospherics qualities of online retailing: A conceptual model and implications. *Journal of Business Research*, *54*(2), 177–184.

Flavián, C., Gurrea, R., & Orús, C. (2010). Effects of visual and textual information in online product presentations: Looking for the best combination in website design. *European Journal of Information Systems*, *19*(6), 668–686. https://doi.org/10.1057/ejis.2010.42

Gehrer, N. A., Schönenberg, M., Duchowski, A. T., & Krejtz, K. (2018). Implementing Innovative Gaze Analytic Methods in Clinical Psychology A Study on Eye Movements in Antisocial Violent Offenders. https://doi.org/10.1145/3204493.3204543

Gentile, J. R., Roden, A. H., & Klein, R. D. (1972). An analysis-of-variance model for the intrasubject replication design1. *Journal of Applied Behavior Analysis*, *5*(2), 1310751. https://doi.org/10.1901/jaba.1972.5-193

Hasan, B. (2016). Perceived irritation in online shopping: The impact of website design characteristics. *Computers in Human Behavior*, *54*, 224–230. https://doi.org/10.1016/j.chb.2015.07.056

Hausman, A. V., & Siekpe, J. S. (2009). The effect of web interface features on consumer online purchase intentions. *Journal of Business Research*, *62*(1), 5–13. https://doi.org/10.1016/j.jbusres.2008.01.018

Herrando, C., Jimenez-Martinez, J., & Hoyos, M. J. M. de. (2018). Surfing or flowing? How to retain e-customers on the internet. *Spanish Journal of Marketing - ESIC*. https://doi.org/10.1108/SJME-03-2018-006

Hoffman, D. L., & Novak, T. P. (2009). Flow Online: Lessons Learned and Future Prospects. *Journal of Interactive Marketing*, *23*(1), 23–34. https://doi.org/10.1016/j.intmar.2008.10.003

Holzschlag, M. E. (1998). *Web by design : the complete guide* (p. 901). Sybex. Retrieved from https://dl.acm.org/citation.cfm?id=522138

Huizingh, E. K. (2000). The content and design of web sites: an empirical study. *Information & Management*, *37*(3), 123–134. https://doi.org/10.1016/S0378-7206(99)00044-0

Jacoby, J. (2002). Stimulus-organism-response reconsidered: An evolutionary step in modeling (consumer) behavior. *Journal of Consumer Psychology*, *12*(1), 51–57. https://doi.org/10.1207/153276602753338081

Katz, M. A., & Byrne, M. D. (2003). Effects of scent and breadth on use of site-specific search on e-commerce Web sites. *ACM Transactions on Computer-Human Interaction*, *10*(3), 198–220. https://doi.org/10.1145/937549.937551

Kim, C., Galliers, R. D., Shin, N., Ryoo, J. H., & Kim, J. (2012). Factors influencing Internet shopping value and customer repurchase intention. *Electronic Commerce Research and Applications*, *11*(4), 374–387. https://doi.org/10.1016/j.elerap.2012.04.002

Kotler, P. (1973). Atmospherics as a marketing tool. *Journal of Retailing*, *49*(4), 48–65. https://doi.org/10.1016/j.obhdp.2011.03.002

Kredel, R., Vater, C., Klostermann, A., & Hossner, E.-J. (2017). Eye-Tracking Technology and the Dynamics of Natural Gaze Behavior in Sports: A Systematic Review of 40 Years of Research. *Frontiers in Psychology*, *8*(October). https://doi.org/10.3389/fpsyg.2017.01845

Lee, J., & Ahn, J.-H. (2012). Attention to Banner Ads and Their Effectiveness: An Eye-Tracking Approach. *International Journal of Electronic Commerce*, *17*(1), 119–137. https://doi.org/10.2753/JEC1086-4415170105

Lemon, K. N., & Verhoef, P. C. (2016). Understanding Customer Experience Throughout the Customer Journey. *Journal of Marketing*, *80*(6), 69–96. https://doi.org/10.1509/jm.15.0420

Leuthold, S., Schmutz, P., Bargas-Avila, J. A., Tuch, A. N., & Opwis, K. (2011). Vertical versus dynamic menus on the world wide web: Eye tracking study measuring the influence of menu design and task complexity on user performance and subjective preference. *Computers in Human Behavior*, *27*(1), 459–472. https://doi.org/10.1016/j.chb.2010.09.009

Li, Q., Sun, L., & Duan, J. (2005). Web page viewing behavior of users: an eye-tracking study. In *Services systems and services management, 2005. Proceedings of icsssm'05. 2005 international conference on* (Vol. 1, pp. 244–249). IEEE.

Lohse, G. L., & Rosen, D. L. (2001). Signaling quality and credibility in yellow pages advertising: The influence of color and graphics on choice. *Journal of Advertising*, *30*(2), 73–83. https://doi.org/10.1080/00913367.2001.10673639

Majaranta, P. (2011). *Gaze Interaction and Applications of Eye Tracking: Advances in Assistive Technologies: Advances in Assistive Technologies.* IGI Global.

McDowell, W. C., Wilson, R. C., & Kile, C. O. (2016). An examination of retail website design and conversion rate. *Journal of Business Research*, *69*(11), 4837–4842. https://doi.org/10.1016/j.jbusres.2016.04.040

Meyer, C., & Schwager, A. (2007). Understanding Customer Experience. https://doi.org/10.1108/00242539410067746

Mitra, K., Reiss, M. C., & Capella, L. M. (1999). An examination of perceived risk, information search and behavioral intentions in search, experience and credence services. *Journal of Services Marketing*, *13*(3), 208–228. https://doi.org/10.1108/08876049910273763

Neslin, S. A., Grewal, D., Leghorn, R., Shankar, V., Teerling, M. L., Thomas, J. S., & Verhoef, P. C. (2006). Challenges and Opportunities in Multichannel

Customer Management. *Journal of Service Research*, *9*(2), 95–112. https://doi.org/10.1177/1094670506293559

Pieters, R., & Wedel, M. (2004). Attention Capture and Transfer in Advertising: Brand, Pictorial, and Text-Size Effects. *Journal of Marketing*, *68*(2), 36–50. https://doi.org/10.1509/jmkg.68.2.36.27794

Pinheiro, J., & Bates, D. (2001). *Mixed-effects models in S and S-PLUS* (1st ed.). Springer-Verlag New York. https://doi.org/10.1007/b98882

Puccinelli, N. M., Goodstein, R. C., Grewal, D., Price, R., Raghubir, P., & Stewart, D. (2009). Customer Experience Management in Retailing: Understanding the Buying Process. *Journal of Retailing*, *85*(1), 15–30. https://doi.org/10.1016/j.jretai.2008.11.003

Reutskaja, E., Nagel, R., Camerer, C. F., & Rangel, A. (2011). American Economic Association Search Dynamics in Consumer Choice under Time Pressure: An Eye-Tracking Study Search Dynamics in Consumer Choice under Time Pressure: An Eye-Tracking Study. *The American Economic Review*, *101*(101), 900–926.

Richard, M. O. (2005). Modeling the impact of internet atmospherics on surfer behavior. *Journal of Business Research*, *58*(12), 1632–1642. https://doi.org/10.1016/j.jbusres.2004.07.009

Rowley, J. (2000). Product search in e-shopping : a review and research propositions. *Journal of Consumer Marketing*, *17*(1), 20–35.

Shim, S., Eastlick, M. A., Lotz, S. L., & Warrington, P. (2001). An online prepurchase intentions model: The role of intention to search. *Journal of Retailing*, *77*(3), 397–416. https://doi.org/10.1016/S0022-4359(01)00051-3

Sopadjieva, E., Dholakia, U., & Benjamin, B. (2017). A study of 46,000 shoppers shows that omnichannel retailing works. *Harvard Business Review*, *3*.

Trijp, H. C. M. V., Hoyer, W. D., & Inman, J. J. (1996). Why Switch? Product Category: Level Explanations for True Variety-Seeking Behavior. *Journal of Marketing Research*, *33*(3), 281–292. https://doi.org/10.2307/3152125

Turley, L., & Milliman, R. E. (2000). Atmospheric Effects on Shopping Behavior. *Journal of Business Research*, *49*(2), 193–211. https://doi.org/10.1016/S0148-2963(99)00010-7

Van Duyne, D. K., Landay, J. A., & Hong, J. I. (2003). *The design of sites : patterns, principles, and processes for crafting a customer-centered Web experience* (p. 762). Addison-Wesley. Retrieved from https://dl.acm.org/citation.cfm?id=548998

Velásquez, J. D. (2013). Combining eye-tracking technologies with web usage mining for identifying Website Keyobjects. *Engineering Applications of Artificial Intelligence*, *26*(5-6), 1469–1478. https://doi.org/10.1016/j.engappai.2013.01.003

Verhoef, P. C., Kannan, P. K., & Inman, J. J. (2015). From Multi-Channel Retailing to Omni-Channel Retailing. Introduction to the Special Issue on Multi-Channel Retailing. *Journal of Retailing*, *91*(2), 174–181. https://doi.org/10.1016/j.jretai.2015.02.005

Verhoef, P. C., Neslin, S. A., & Vroomen, B. (2007). Multichannel customer management: Understanding the research-shopper phenomenon. *International*

Journal of Research in Marketing, *24*(2), 129–148. https://doi.org/10.1016/j.ijresmar.2006.11.002

Wang, Q., Yang, S., Liu, M., Cao, Z., & Ma, Q. (2014). An eye-tracking study of website complexity from cognitive load perspective. *Decision Support Systems*, *62*, 1–10. https://doi.org/10.1016/j.dss.2014.02.007

Wedel, M. (2015). Attention research in marketing: A review of eye-tracking studies. *The Handbook of Attention*, 569–588.

Wedel, M., & Pieters, R. (2008). A Review of Eye-Tracking Research in Marketing. In *Review of marketing research* (Vol. 4, pp. 123–147).

Yu, B. M., & Roh, S. Z. (2002). The effects of menu design on information-seeking performance and user's attitude on the world wide web. *Journal of the American Society for Information Science and Technology*, *53*(11), 923–933. https://doi.org/10.1002/asi.10117

Zaharia, S., Kauke, D., & Hartung, E. (2017). Eye-Tracking Analysis of Gender-Specific Online Information Research and Buying Behavior. In *HCI in business, government and organizations. Supporting business* (Vol. 10294, pp. 143–159). https://doi.org/10.1007/978-3-319-58484-3

Tables

Table 1. Descriptive Statistics

Name	Mean	SD	Min.	Median	Max.
Knowledge					
Knowledge_Sport shoes	4.483	1.417	1	4.0	7
Knowledge_Mobile phones	4.190	1.456	1	4.0	7
Knowledge_Ball-point pens	3.362	1.347	1	4.0	6
Knowledge_Hard disks	2.724	1.684	1	2.0	7
Importance					
Importance_Sport shoes	5.224	0.992	3	5.0	7
Importance_Mobile phones	4.966	1.737	1	5.0	7
Importance_Ball-point pens	2.707	1.451	1	2.0	7
Importance_Hard disks	3.897	1.754	1	4.0	7
Interest					
Interest_Sport Shoes	5.534	1.127	2	5.5	7
Interest_Mobile phones	6.138	1.317	2	7.0	7
Interest_Ball-point pens	2.983	1.516	1	3.0	7
Interest_Hard disks	4.931	1.520	1	5.0	7
Ease with online information seeking	8.103	1.435	4	8.0	10
Ease with online shopping	7.293	1.727	2	7.0	10

Table 2. Model 1: Seconds by task

	Estimate	Std. Error	p value
Intercept	19.762	5.384	0.000
Task (base exploration)			
Search	4.299	1.707	0.012
Purchase	-8.762	1.666	0.000
After Sale	-8.620	1.699	0.000
Category (base sport shoes)			
Mobile phones	4.123	1.806	0.022
Ball-point pens	-2.062	1.850	0.265
Hard disks	1.834	1.708	0.283
Involvement	-0.346	0.262	0.186
Search Online	-0.080	0.896	0.929
Purchase Online	0.015	0.747	0.984
Random part			
	Variance	Std.Dev.	
Subject	22.680	80.239	
Residual	4.762	8.958	
Fit			
AIC	1743.581		
BIC	1784.942		
Residual DF	220.000		
Subjects	58.000		

Note: Linear mixed model fit by maximum likelihood

Table 3. Model 2: Fixations by zone

	Zone A (Header)			Zone B (Menu)			Zone C (Products)		
	Estimate	Std. Error	p value	Estimate	Std. Error	p value	Estimate	Std. Error	p value
Intercept	0.013	0.014	0.349	0.028	0.014	0.036	0.329	0.050	0.000
Task (base exploration)									
Search	-0.035	0.005	0.000	-0.020	0.006	0.000	0.116	0.018	0.000
Purchase	-0.033	0.005	0.000	-0.014	0.005	0.012	0.066	0.017	0.000
After Sale	-0.015	0.005	0.006	0.061	0.006	0.000	-0.164	0.018	0.000
Category (base sport shoes)									
Mobile phones	0.002	0.006	0.722	-0.008	0.006	0.196	0.003	0.019	0.869
Ball-point pens	-0.008	0.006	0.170	-0.013	0.006	0.025	0.055	0.019	0.004
Hard disks	-0.005	0.005	0.339	-0.009	0.006	0.126	0.021	0.018	0.239
Involvement	-0.001	0.001	0.520	-0.001	0.001	0.470	0.003	0.003	0.326
Search Online	0.005	0.002	0.048	-0.003	0.002	0.236	-0.006	0.008	0.480
Purchase Online	0.000	0.002	0.877	0.004	0.002	0.024	-0.006	0.007	0.378
Random part									
	Variance	Std.Dev.		Variance	Std.Dev.		Variance	Std.Dev.	
Subject	0.000	0.001		0.000	0.001		0.001	0.009	
Residual	0.009	0.028		0.006	0.029		0.039	0.092	
Fit									
AIC	-952.923			-948.070			-392.129		
BIC	-911.562			-906.709			-350.768		
Residual DF	220.000			220.000			220.000		
Subjects	58.000			58.000			58.000		

Note: Linear mixed model fit by maximum likelihood

Table 4. Model 3: Generalized Mixed Effects Regression. Probability Transitions to Zone A (Header)

	Transitions ZA (Header) -> ZA			Transitions ZB (Menu) -> ZA			Transitions ZC (Products) -> ZA		
	Estimate	Std. Error	Pr(>|z|)	Estimate	Std. Error	Pr(>|z|)	Estimate	Std. Error	Pr(>|z|)
Intercept	-4.215	0.724	0.000	-6.699	1.153	0.000	-6.011	0.639	0.000
Task (base exploration)									
Search	-1.725	0.078	0.000	-2.433	0.867	0.005	-0.431	0.250	0.084
Purchase	-1.411	0.071	0.000	-1.394	0.529	0.008	-0.488	0.251	0.052
After Sale	-0.452	0.059	0.000	-0.102	0.367	0.780	-0.885	0.284	0.002
Category (base sport shoes)									
Mobile phones	0.144	0.075	0.054	-0.451	0.478	0.345	0.373	0.272	0.170
Ball-point pens	-0.331	0.079	0.000	-0.548	0.483	0.256	-0.069	0.293	0.813
Hard disks	-0.080	0.070	0.250	-0.765	0.488	0.117	-0.101	0.280	0.717
Involvement	0.017	0.012	0.143	0.006	0.068	0.928	-0.006	0.037	0.863
Search Online	0.263	0.128	0.039	0.141	0.172	0.412	0.106	0.099	0.281
Purchase Online	0.024	0.107	0.825	0.009	0.145	0.953	0.033	0.083	0.688
Random part									
	Variance	Std.Dev.		Variance	Std.Dev.		Variance	Std.Dev.	
Subject	0.822	0.822		0.000	0.000		0.000	0.000	
Residual	0.907	0.907		0.000	0.000		0.000	0.000	
Fit									
AIC	2088.882			92.788			179.845		
BIC	2126.796			130.702			217.759		
Residual DF	221.000			221.000			221.000		
Subjects	58.000			58.000			58.000		

Note: Logistic link, optimizer BOBYQA

Table 5. Model 3: Generalized Mixed Effects Regression. Probability Transitions to Zone B: Menu

	ZB (Menu) -> ZB			Transitions ZA (Header) -> ZB			Transitions ZC (Products) -> ZB		
	Estimate	Std. Error	Pr(>|z|)	Estimate	Std. Error	Pr(>|z|)	Estimate	Std. Error	Pr(>|z|)
Intercept	-2.056	0.891	0.021	-7.182	1.067	0.000	-4.430	0.708	0.000
Task (base exploration)									
Search	-1.965	0.090	0.000	-2.550	0.875	0.004	-0.545	0.351	0.121
Purchase	-0.951	0.063	0.000	-1.472	0.554	0.008	-0.468	0.329	0.155
After Sale	2.218	0.052	0.000	0.277	0.333	0.405	0.452	0.275	0.101
Category (base sport shoes)									
Mobile phones	-0.344	0.071	0.000	0.009	0.431	0.983	-0.581	0.326	0.074
Ball-point pens	-0.786	0.074	0.000	-0.679	0.493	0.168	-0.366	0.326	0.261
Hard disks	-0.702	0.064	0.000	-0.225	0.423	0.596	-0.454	0.306	0.137
Involvement	-0.065	0.012	0.000	-0.026	0.061	0.673	0.019	0.045	0.668
Search Online	-0.090	0.159	0.569	0.253	0.159	0.112	-0.087	0.112	0.435
Purchase Online	0.256	0.132	0.053	-0.038	0.131	0.775	-0.034	0.093	0.715
Random part									
	Variance	Std.Dev.		Variance	Std.Dev.		Variance	Std.Dev.	
Subject	1.314	1.314		0.000	0.000		0.000	0.000	
Residual	1.146	1.146		0.000	0.000		0.000	0.000	
Fit									
AIC	3106.425			100.206			125.958		
BIC	3144.339			138.120			163.872		
Residual DF	221.000			221.000			221.000		
Subjects	58.000			58.000			58.000		

Note: Logistic link, optimizer BOBYQA

Table 6. Model 3: Generalized Mixed Effects Regression. Probability Transitions to Zone C: Products

	Transitions ZC (Products) -> ZC			Transitions ZA (Header) -> ZC			Transitions ZB (Menu) -> ZC		
	Estimate	Std. Error	Pr(>|z|)	Estimate	Std. Error	Pr(>|z|)	Estimate	Std. Error	Pr(>|z|)
Intercept	1.949	0.725	0.007	-5.995	0.621	0.000	-4.597	0.746	0.000
Task									
Search	1.972	0.058	0.000	-0.316	0.244	0.196	-0.560	0.354	0.114
Purchase	1.347	0.049	0.000	-0.247	0.233	0.289	-0.538	0.344	0.118
PostPurchase	-1.760	0.047	0.000	-0.751	0.276	0.007	0.164	0.296	0.580
Category									
Smartphones	0.211	0.058	0.000	0.087	0.262	0.739	-0.378	0.351	0.282
Pens	0.735	0.058	0.000	-0.042	0.269	0.877	-0.337	0.361	0.351
HDs	0.585	0.052	0.000	-0.244	0.265	0.357	-0.122	0.316	0.699
Involvement	0.029	0.009	0.001	0.017	0.036	0.646	0.014	0.047	0.771
Search Online	-0.049	0.129	0.704	0.072	0.096	0.453	-0.052	0.119	0.662
Purchase Online	-0.207	0.108	0.056	0.051	0.081	0.526	-0.063	0.099	0.519
Random part									
	Variance	Std.Dev.		Variance	Std.Dev.		Variance	Std.Dev.	
Subject	0.876	0.876		0.014	0.014		0.000	0.000	
Residual	0.936	0.936		0.116	0.116		0.000	0.000	
Fit									
AIC	4287.111			182.060			135.803		
BIC	4325.025			219.974			173.717		
Residual DF	221.000			221.000			221.000		
Subjects	58.000			58.000			58.000		

Note: Logistic link, optimizer BOBYQA

Figure 1. Boxplot. Time Spent by Task (seconds)

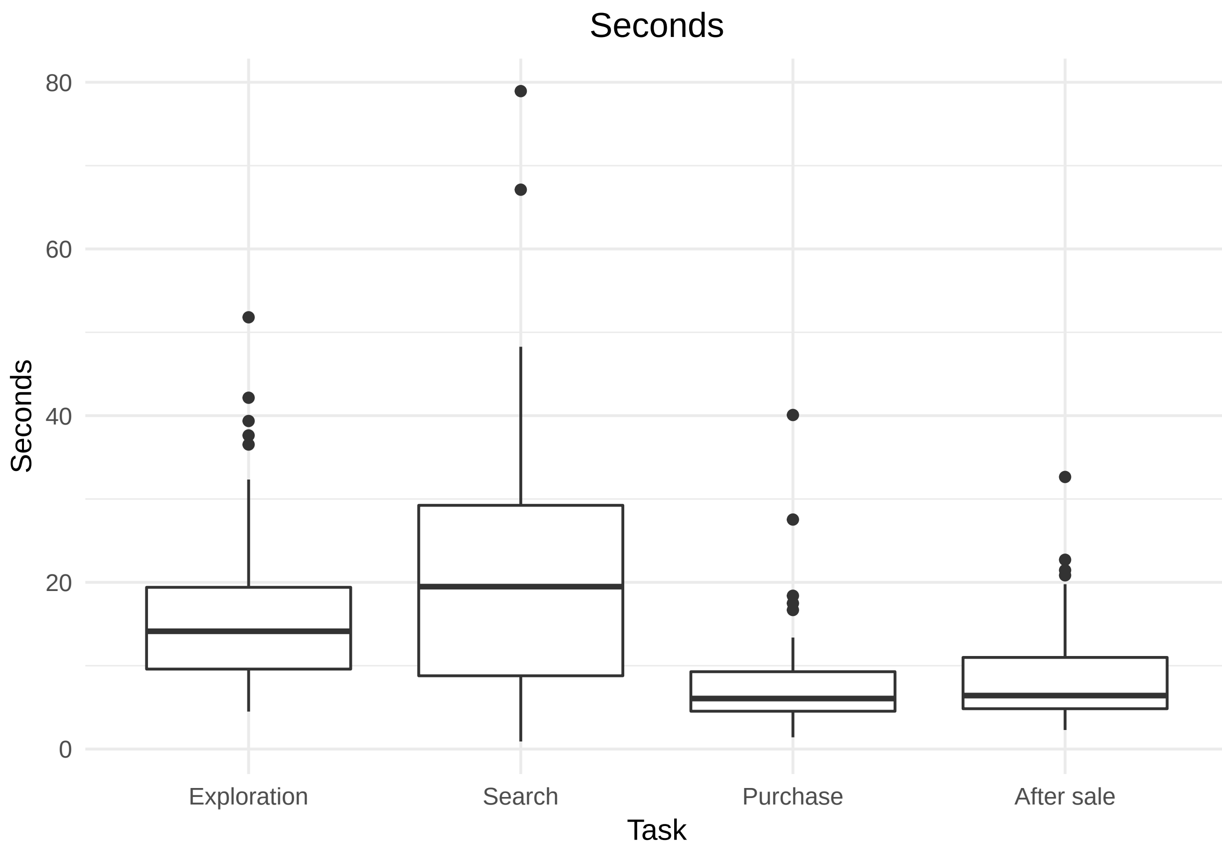
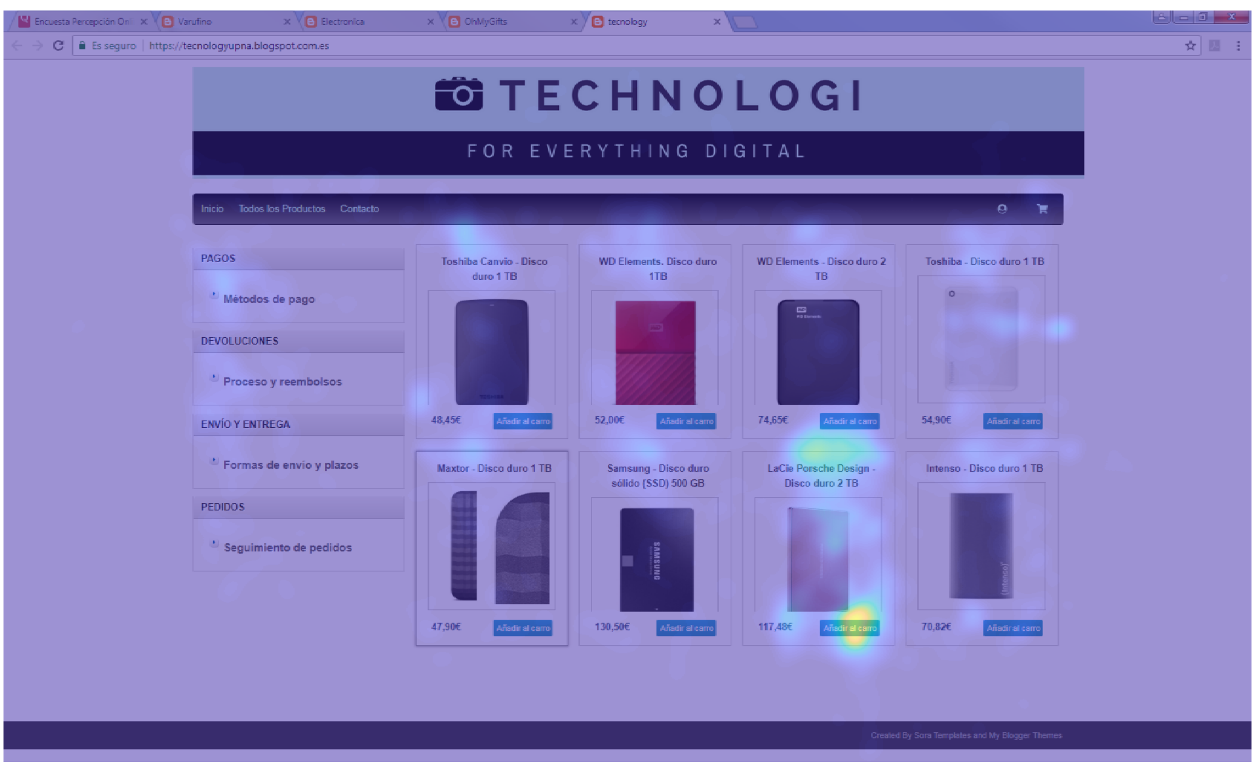


Figure 2. Aggregated Fixations by zone. Hard Disks Store.

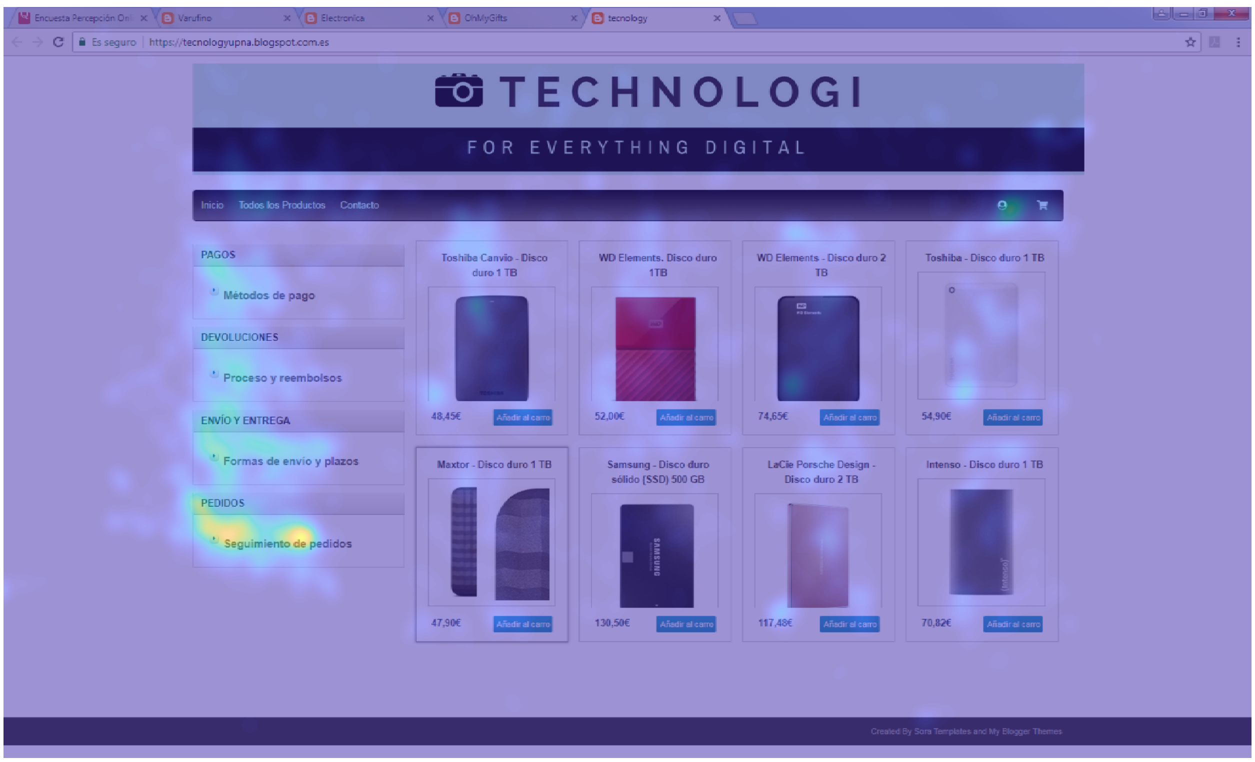
(This figure must be printed in color)

Exploration

Search



Purchase



TECHNOLOGI
FOR EVERYTHING DIGITAL
Inicio
Todos los Productos
Contacto
PAGOS
Métodos de pago
DEVOLUCIONES
Proceso y reembolsos
ENVÍO Y ENTREGA
Formas de envío y plazos
PEDIDOS
Seguimiento de pedidos
Toshiba Canvio - Disco duro 1 TB
48,45€
WD Elements. Disco duro 1TB
52,00€
WD Elements - Disco duro 2 TB
74,65€
Toshiba - Disco duro 1 TB
54,90€
Maxtor - Disco duro 1 TB
47,90€
Samsung - Disco duro sólido (SSD) 500 GB
130,50€
LaCie Porsche Design - Disco duro 2 TB
117,48€
Intenso - Disco duro 1 TB
70,82€

After sale

Figure 3. Boxplots. Fixations by Zone and Task

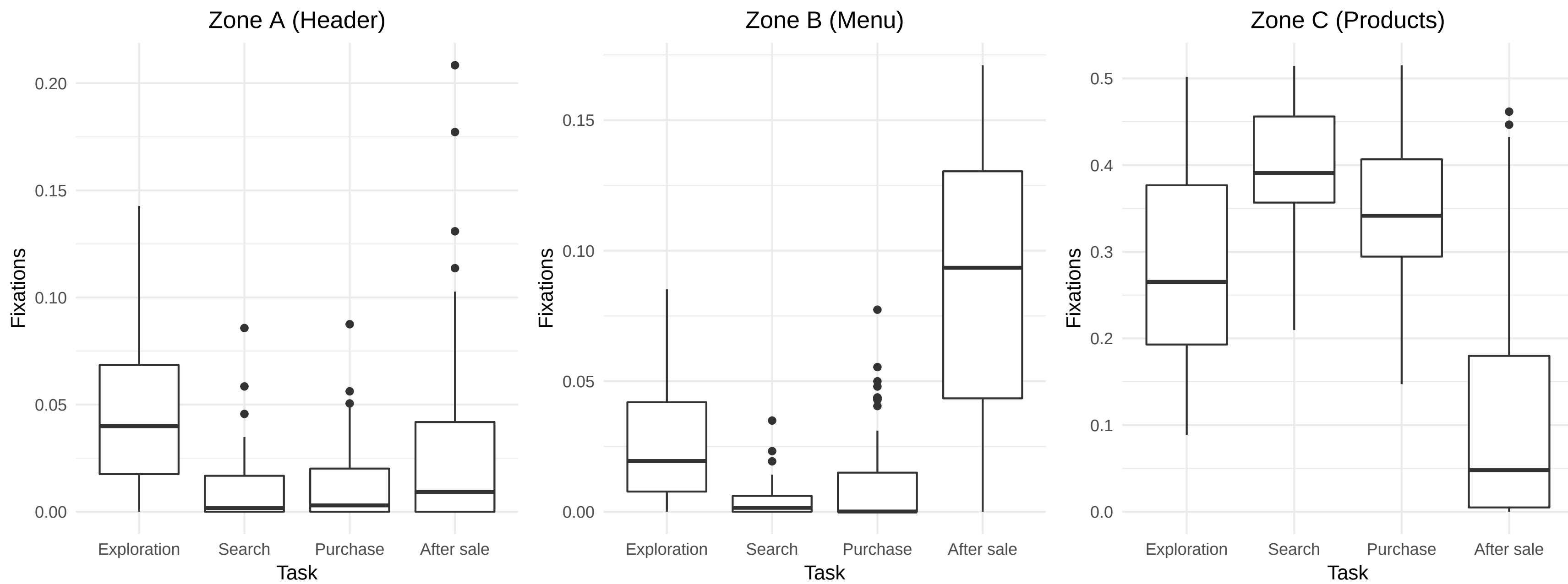
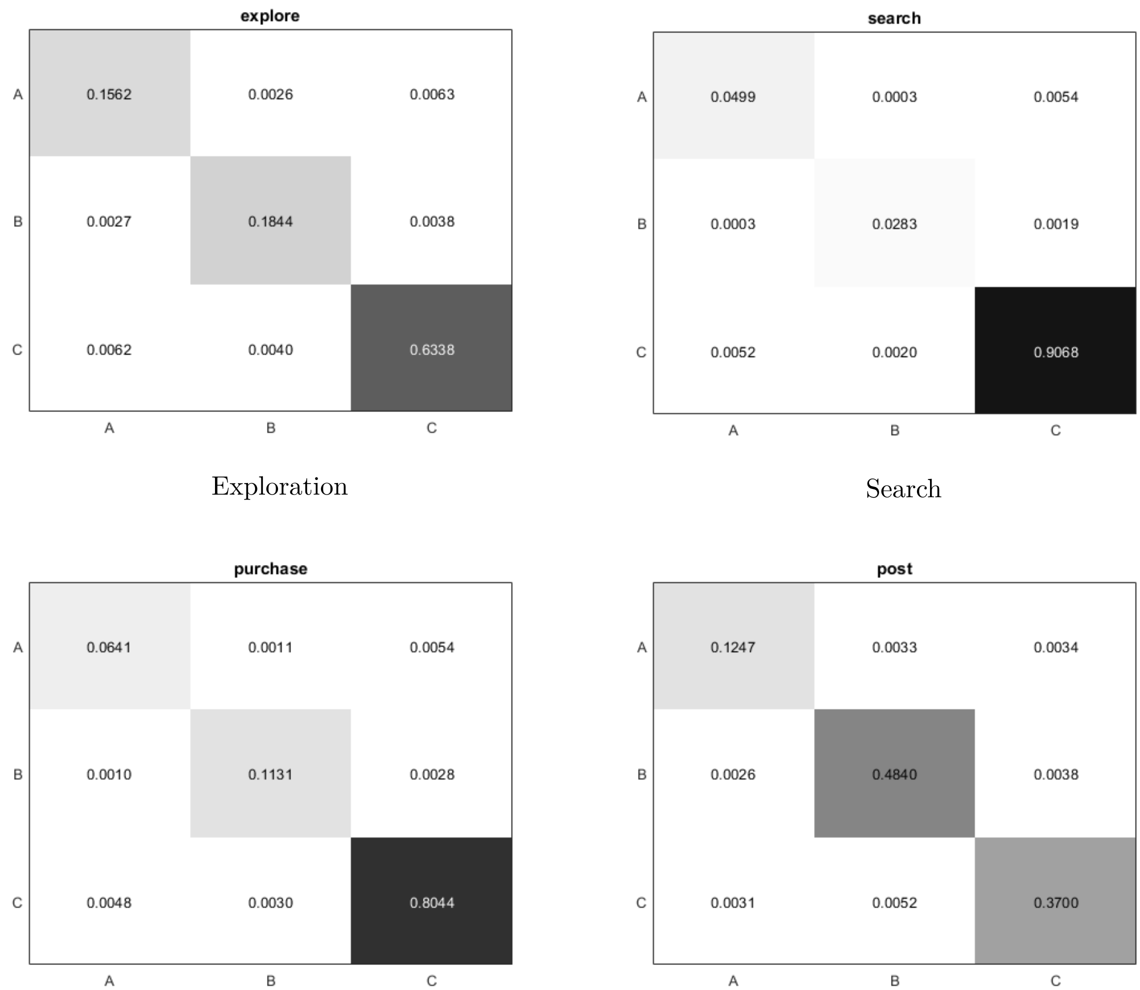


Figure 4. Transition Matrices



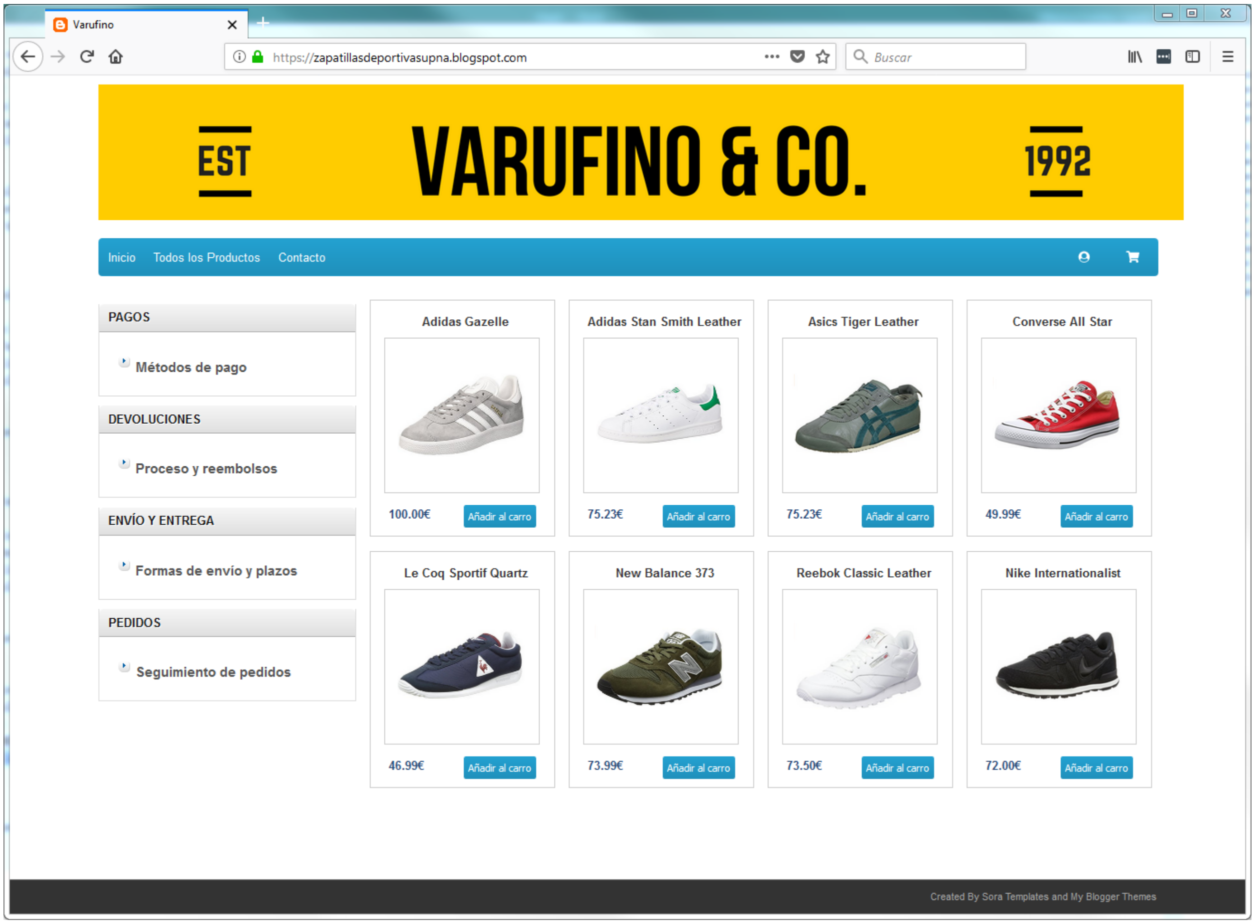
Exploration

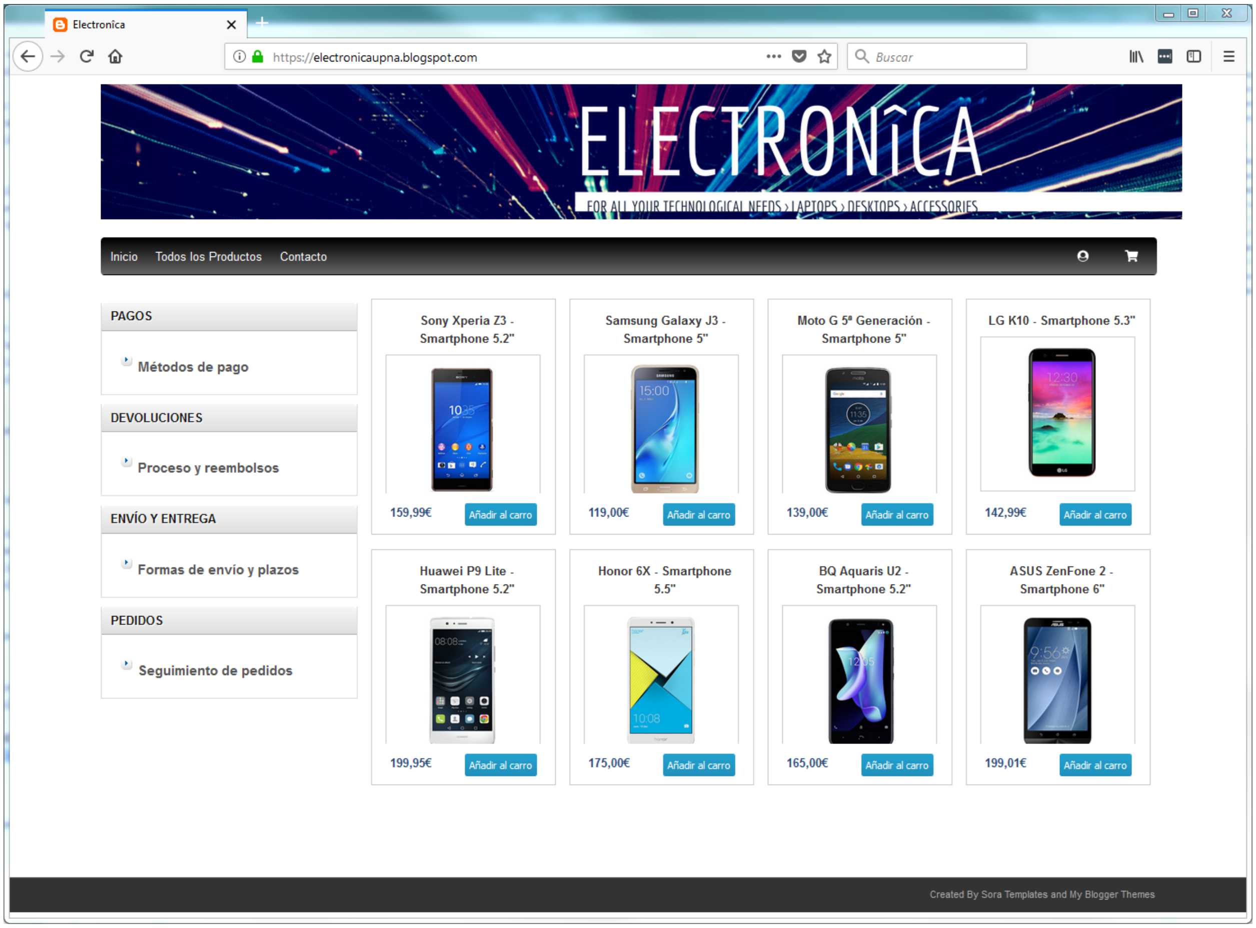
Search

Purchase

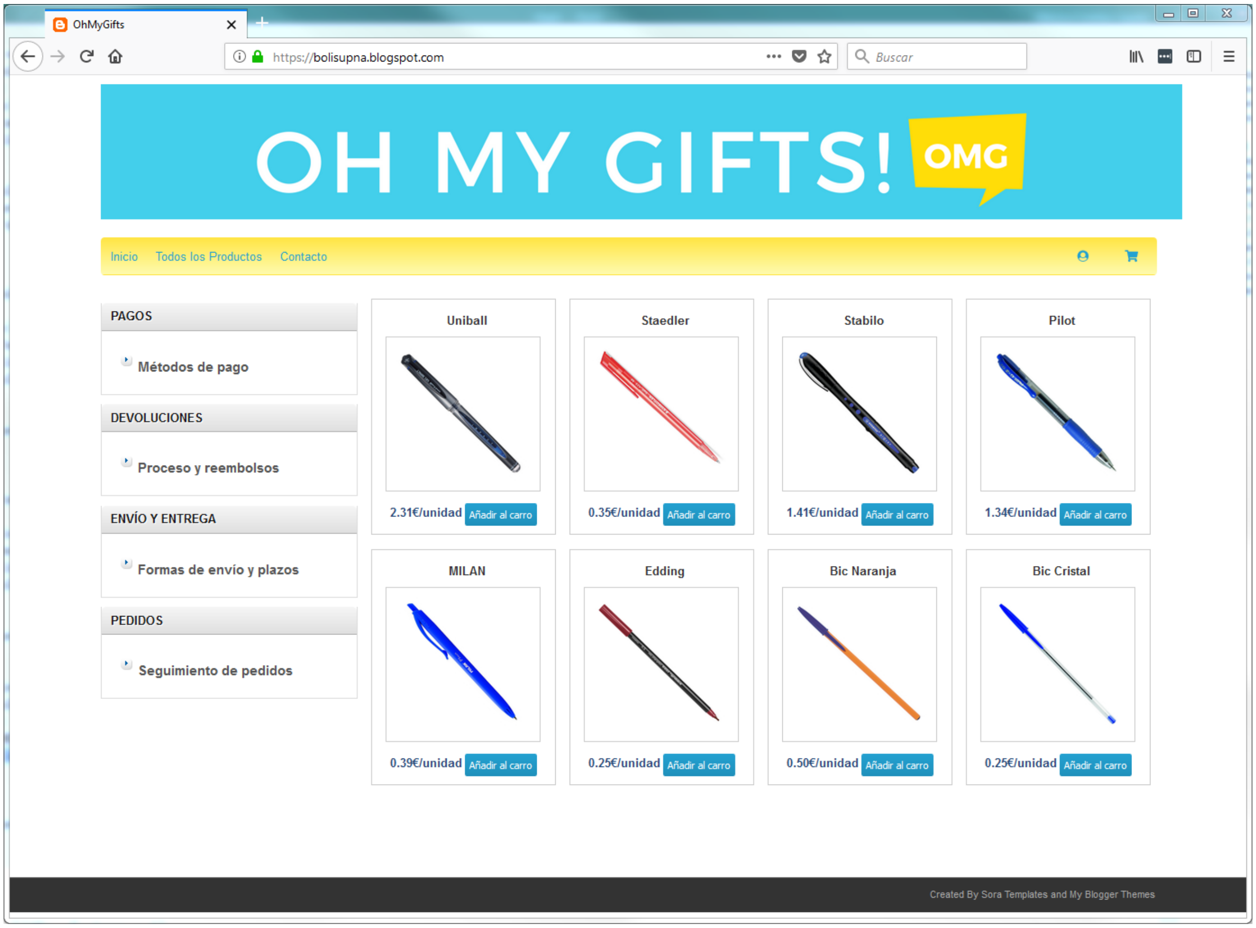
After sale

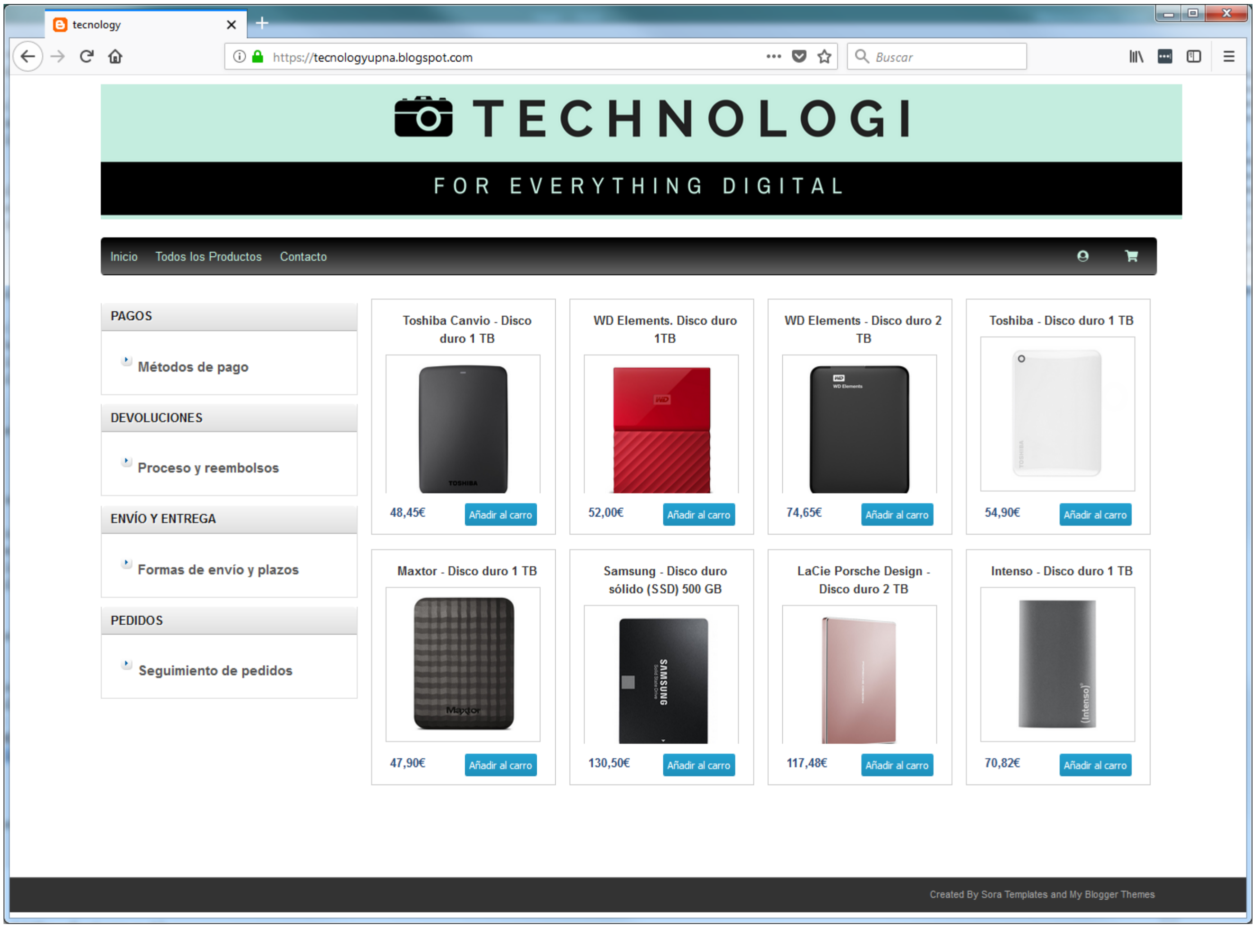
Annex 1


Varufino
https://zapatillasdeportivasupna.blogspot.com
Buscar
EST
VARUFINO & CO.
1992
Inicio
Todos los Productos
Contacto
PAGOS
Métodos de pago
DEVOLUCIONES
Proceso y reembolsos
ENVÍO Y ENTREGA
Formas de envío y plazos
PEDIDOS
Seguimiento de pedidos
Adidas Gazelle
100.00€
Añadir al carro
Adidas Stan Smith Leather
75.23€
Añadir al carro
Asics Tiger Leather
75.23€
Añadir al carro
Converse All Star
49.99€
Añadir al carro
Le Coq Sportif Quartz
46.99€
Añadir al carro
New Balance 373
73.99€
Añadir al carro
Reebok Classic Leather
73.50€
Añadir al carro
Nike Internationalist
72.00€
Añadir al carro
Created By Sora Templates and My Blogger Themes



Electronica
https://electronicaupna.blogspot.com
Buscar
ELECTRONICA
FOR ALL YOUR TECHNOLOGICAL NEEDS › LAPTOPS › DESKTOPS › ACCESSORIES
Inicio
Todos los Productos
Contacto
PAGOS
Métodos de pago
DEVOLUCIONES
Proceso y reembolsos
ENVÍO Y ENTREGA
Formas de envío y plazos
PEDIDOS
Seguimiento de pedidos
Sony Xperia Z3 - Smartphone 5.2"
159,99€
Añadir al carro
Samsung Galaxy J3 - Smartphone 5"
119,00€
Añadir al carro
Moto G 5ª Generación - Smartphone 5"
139,00€
Añadir al carro
LG K10 - Smartphone 5.3"
142,99€
Añadir al carro
Huawei P9 Lite - Smartphone 5.2"
199,95€
Añadir al carro
Honor 6X - Smartphone 5.5"
175,00€
Añadir al carro
BQ Aquaris U2 - Smartphone 5.2"
165,00€
Añadir al carro
ASUS ZenFone 2 - Smartphone 6"
199,01€
Añadir al carro
Created By Sora Templates and My Blogger Themes


OhMyGifts
https://bolisupna.blogspot.com
Buscar
OH MY GIFTS!
OMG
Inicio
Todos los Productos
Contacto
PAGOS
Métodos de pago
DEVOLUCIONES
Proceso y reembolsos
ENVÍO Y ENTREGA
Formas de envío y plazos
PEDIDOS
Seguimiento de pedidos
Uniball
2.31€/unidad
Añadir al carro
Staedler
0.35€/unidad
Añadir al carro
Stabilo
1.41€/unidad
Añadir al carro
Pilot
1.34€/unidad
Añadir al carro
MILAN
0.39€/unidad
Añadir al carro
Edding
0.25€/unidad
Añadir al carro
Bic Naranja
0.50€/unidad
Añadir al carro
Bic Cristal
0.25€/unidad
Añadir al carro
Created By Sora Templates and My Blogger Themes


tecnology
https://tecnologyupna.blogspot.com
Buscar
TECHNOLOGI
FOR EVERYTHING DIGITAL
Inicio
Todos los Productos
Contacto
PAGOS
Métodos de pago
DEVOLUCIONES
Proceso y reembolsos
ENVÍO Y ENTREGA
Formas de envío y plazos
PEDIDOS
Seguimiento de pedidos
Toshiba Canvio - Disco duro 1 TB
48,45€
Añadir al carro
WD Elements. Disco duro 1TB
52,00€
Añadir al carro
WD Elements - Disco duro 2 TB
74,65€
Añadir al carro
Toshiba - Disco duro 1 TB
54,90€
Añadir al carro
Maxtor - Disco duro 1 TB
47,90€
Añadir al carro
Samsung - Disco duro sólido (SSD) 500 GB
130,50€
Añadir al carro
LaCie Porsche Design - Disco duro 2 TB
117,48€
Añadir al carro
Intenso - Disco duro 1 TB
70,82€
Añadir al carro
Created By Sora Templates and My Blogger Themes

Annex 2. Questionnaire

For each of the four categories (sports shoes, mobile phones, all-point pens, hard disks)

Q1. In what follows, we will be talking about category X.

Have you ever bought anything from category X? *Yes / No / Don't know / Don't remember*

Q2. How often do you buy X? *(different interval scale for each category)*

Q3. Have you ever bought a/some X? *Yes / No / Don't know / Don't remember*

Q4. How often do you go online to buy X? *Never (0) - Always (10)*

Q5. Task presentation: Next, we are going to show you an online X store. *Randomly present one of the following tasks*:

- TASK 1: We would like you to focus on the appeal of the web page. When you click on the link:

1. Look at the page and consider how much it appeals to you.
2. Once you have formed an opinion, click on any link to return to the questionnaire and answer the questions How appealing do you find this web page? *Not at all appealing (1) – Very appealing (7)*

- TASK 2: We would like you to visit the store to select the model that most appeals to you based on the information you find on screen. When you click on the link:

1. Select the product you would be most likely to buy if you had to choose from the options presented
2. Add it to your cart. Please select the chosen model or models. *(different options for each category)*

- TASK 3: We would like you to visit the store to purchase a specific model. When you click on the link, you are required to purchase model X, take all the time you need:

1. Please visit the store and locate the model "Z" *(different models for each category)*
2. Add it to your cart. How difficult did you find this task? *Extremely difficult (1) – Extremely easy (7)*

- TASK 4: You are required to check the status of an order placed by someone else a week ago.

1. Please visit the store and look to see where you think you might find the information you require.
2. Click on what you consider to be the best link for finding the information you require. How difficult did you find this task? *Extremely difficult (1) – Extremely easy (7)*

Q6. Indicate your level of agreement or disagreement with the following statements:

- My knowledge of X is very good *1-Disagree strongly-7 (Agree strongly)*
- It is important for me to make the right choice when shopping for X *1- Disagree strongly-7 (Agree strongly)*
- I find shopping for X interesting *1- Disagree strongly-7 (Agree strongly)*

Q7. When shopping for X online, how do you rate the following in terms of importance?

- Price *1-Very low-7 (very high)*
- Brand *1- Very low-7 (very high)*
- Payment modes *1- Very low-7 (very high)*
- Returns and Money Back terms *1- Very low-7 (very high)*
- Delivery modes and times *1- Very low-7 (very high)*
- Order Tracking 1 *1- Very low-7 (very high)*

After completing all four categories:

Q8. On a scale of 0 to 10, how would you rate your degree of ease with seeking information through the Internet? *Extremely low (0) – Extremely high (10)*

Q9. On a scale of 0 to 10, how would you rate your degree of ease with shopping on the Internet? *Extremely low (0) – Extremely high (10)*

Q10. Sex *Male / Female*

Q11. Year of birth

Q12. Level of education attained. *No formal education credential / Primary / Secondary / Bachelor's degree / Master's degree / PhD*

Q13. Main occupation. If more than one, please indicate the one you consider most relevant. *Student / Retired / Homemaker / Unemployed / Employed / Self-employed*