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New Dynamics of e-Commerce on the Retail Industry: Analysis of the Purchase Process of Fashion and Electronics Products

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Abstract

The technology-mediated environment promoted the creation of new dynamics in the retail sector. To understand how the emergence of e-commerce has impacted the retail sector, this study analysed two distinct product typologies: fashion and electronics. Among the various conclusions of this work, we highlight a clear resistance to the emergence of e-commerce, even though a considerable part of the sample declares that the frequency of visits to physical stores has decreased, and the total frequency of purchases has increased after the appearance of e-commerce. The probability of completion of the purchase occurring on either platform increases when the search for information occurs on the same platform, however, possibly justified by the level of complexity of the product, the probability of the customer staying on the same platform during the electronics purchase process is marginally inferior to the fashion product model.

Keywords: e-commerce; retails; stores; fashion; electronics.

1. Introduction

The technology-mediated environment promoted the creation of new dynamics in the retail sector, namely in the scope of research, comparison, product evaluation and the act of purchase (Foroudi, Gupta, Sivarajah, & Broderick, 2018). Due to the ubiquity of the Internet, the retail sector, which was initially characterized by a mono-channel context, where only a single retail channel was used in the interaction with the customer, typically the physical store, has become a growing integration of the online and offline commerce, called omnichannel (S. Shi, Wang, Chen, & Zhang, 2020). Despite the growing penetration of the online platform as a means of shopping, there is still a relative discomfort with the act of purchasing through this channel, justified by factors such as insecurity associated with payment or the long wait for the product to arrive (Katawetawaraks & Wang, 2015).

In the academic scope, several studies analysed the four possible impacts of e-commerce on the frequency and characterization of trips to physical stores proposed by Patricia L. Mokhtarian (2004, 2008) and Patricia Lyon Mokhtarian (1990), namely substitution, complementarity, modification and neutrality. The discrepancy of the results reflects the absence of an absolute truth regarding the effect generated by the emergence of e-commerce. Factors such as the geographic, socioeconomic and cultural context of the sample (Calderwood & Freathy, 2014; K. Shi, De Vos, Yang, & Witlox, 2019) or the type of product under analysis manifest a significant influence on the type of customer interaction between the two platforms and their purchase determinants (Kim, Song, Choi, Kim, & Hong, 2019).

To create an appropriate strategy focused on the consumer's needs, the access to information about consumer behaviour is crucial (Pereira et al., 2021), so this study will contribute to a deeper and more focused knowledge of Lisbon consumers. To address this issue the following topics will be covered: 1) identification of the effect of the emergence of e-commerce on consumer buying behaviour; 2) understand the interactions between the online channel and the physical channel in two of the phases of the purchasing process, the search for information and the purchase, for two types of products under analysis: fashion and electronic products. 3) identify the determinant factors on the frequency of information search and purchase in each channel (physical and online), for each type of product. The article is structured as follow: section 2 presents the literature review that is used to support the research; section 3 details the methodology, data gathering process and the sample used; section 4 present the results that were obtained; and section 5 delivers the discussion and final conclusions.

2. Literature Review

Worldwide, the growth of e-commerce as an alternative to the traditional shopping process has been notorious, the number of online shoppers has increased year after year (Clement, 2019). In Portugal, the report by CTT - Correios de Portugal (2020) confirms the growth trend of e-Commerce, with a growth rate in 2019 higher than the previous year (20% versus 17%), although only 39% of Portuguese companies have an online presence, with only 27% doing business on this platform. This result reflects a low digital development on the part of Portuguese companies and could be one of the factors that lead more than 80% of online shoppers to choose to buy from foreign retailers, such as AliExpress, eBay, Amazon, Wish and Gearbest.

In the last year, the online presence of retailers has become critical, as on March 11, 2020, the World Health Organization (WHO) declared a pandemic state due to the spread of the COVID-19 virus. In the last year the world has changed drastically, the spread of the new virus has changed the way people live, severely impacting the global economy (Fernandes, 2020). The long-term effects are not yet known, however, in the short-term it is already possible to see significant impacts in the retail sector. Due to the limited circulation hours and confinement policies implemented with the aim of containing the spread of the virus, the vast majority of physical retail stores were forced to close and retailers were forced to move more quickly towards alternatives to traditional commerce, such as orders and services made online or the click and collect option (Gauri et al., 2020; Shankar et al., 2020). As a result of the economic contraction, there is an increase in unemployment, added to the decrease in purchasing power and the consequent decrease in expenditure by consumers (Dias et al., 2021).

Based on the theory initially developed by Salomon (1986) and later expanded by Mokhtarian (Patricia L. Mokhtarian, 2004, 2008; Patricia Lyon Mokhtarian, 1990), four types of possible impacts of the evolution of telecommunications on the frequency and characterization of trips to physical stores: 1) substitution; 2) complementarity; 3) modification; 4) neutrality.

Cao, Xu, and Douma (2012) analysed the interactions between online and in-store commerce, in Minneapolis-Saint Paul, and found that the search for online information has a positive influence on the frequency of purchase on both platforms, results confirmed by Davis, California, whose study indicates that there is a complementary relationship between the frequency of purchases online and in physical stores, as well as a set of explanatory variables, such as perceptions, attitudes and personal characteristics (Lee, Sener, Mokhtarian, & Handy, 2017; Dias & Lages, 2021). On the other hand, in China, Chengdu, the impact of online commerce on the frequency of trips to physical stores was analysed in four types of products (clothes and shoes, electronics, food and beverage and cosmetics) using regression

models. The data allowed us to conclude that the substitution effect dominates, which may be justified by the high use of public transport as a means of transport to physical stores and the consequent loss of time of its users when compared with individuals who travel in their private cars to the physical stores (K. Shi et al., 2019). Also in China, studies carried out in different cities have shown different results from those observed in Chengdu. For example, in Nanjing, it was concluded that the search for information in an online environment promotes purchases both on the physical platform and on the online platform, generating a complementary effect between platforms (Xi, Zhen, Cao, & Xu, 2018). Aided by a GPS travel diary and conducting an SEM analysis, Ding & Lu (2017) concluded that in Beijing, purchase frequency on the online platform has a positive effect both on purchase frequency on the physical platform and also on demand for product information on the online platform (Ding & Lu, 2017), thesis confirmed by Etminani-Ghasrodashti and Hamidi (2020) in Iran.

In North Carolina, with a focus on two types of products, clothing and books, Zhai, Cao, Mokhtarian, & Zhen (2017) suggest that the probability of completion of the purchase of fashion products occurring on the Internet increases if the search for information happens on the same platform, however, for this type of product, the purchase process is more likely to take place on the physical platform. Contrary to the most common findings, Sim & Koi (2002) suggest that online commerce does not have a significant impact on traditional commerce patterns in Singapore, as the community prefers to use physical stores rather than online stores, concluding that there is a neutrality effect similarly to the conclusion reached by Calderwood & Freathy (2014) which found that about 80% of respondents indicate that the frequency of trips to physical stores was not affected by online commerce in the Scottish islands. The diversity of conclusions may be justified by different specific situational factors, such as the geographic and socioeconomic context of the sample selected for the study (Calderwood & Freathy, 2014; K. Shi et al., 2019), the type, cost and complexity of the product under analysis (Kim et al., 2019) or even the study method itself.

The ubiquity of Internet access has resulted in the growing trend towards integrating online and offline commerce. This phenomenon is called omnichannel, where the different transactional and informational contact points come together in order to provide a coherent and integrated journey between multiple platforms for the consumer (Shen, Li, Sun, & Wang, 2018; S. Shi et al., 2020). Although the preference for the combination of platforms during the purchase process is growing, there are still consumers who are limited exclusively to online channels or physical channels. The reasons can be varied, including staying in a single channel as a means to avoid risks associated with switching to another channel (Willems, Smolders, Brengman, Luyten, & Schöning, 2017) (Kim et al., 2019) or the tendency to use, in most cases, only one of the channels as a matter of habit (Cambra-Fierro, Kamakura, Melero-Polo, & Sese, 2016). Schmid and Axhausen (2019) concluded that consumers prefer to purchase products whose quality has greater variability in physical stores. In addition, (Kim et al., 2019) found that low-involvement products do not require a high level of research, which, consequently, will make consumers prefer to simplify the purchase process and remain on a single platform during the process.

Multiple empirical studies have analyzed the determinants of purchasing behavior, however, the results achieved are not always consistent. The impact of sociodemographic characteristics is frequently analyzed. Part of the literature reports that age negatively influences the online shopping process (Ding & Lu, 2017; Etminani-Ghasrodashti & Hamidi, 2020; Maat & Konings, 2018), however Zhen, Du, Cao, & Mokhtarian (2018) argued that this is a non-linear relationship, up to 33 years of age the probability of purchasing products online increases with advancing age, from 33 years onwards this probability decreases. Cao et al. (2012) conclude that older people tend to generate more trips to physical stores, suggesting that it is associated with increasing family responsibilities correlated with advancing age. Regarding the gender factor, K. Shi et al. (2019) states that women tend to buy both online and in physical stores more frequently when compared to males. Zhen, Cao, Mokhtarian & Xi (2016) state that men tend to shop more for electronic products online, while women are more likely to purchase fashion products through the internet. In terms of earned income, some studies indicate that individuals who earn a higher income tend to generate more interactions with the online purchase channel (Etminani-Ghasrodashti & Hamidi, 2020; Xi et al., 2018; Zhen et al., 2016), in contrast K. Shi et al. (2019) found a negative association relationship between income and purchase frequency both online and physically, justified by perceived time pressure. Zhen et al. (2016) concluded that in the context of clothing purchase, the level of training obtained has a negative effect on the frequency of purchase of this type of product in physical stores, while Cao et al. (2012) reports an association positive between the level of training and the tendency to generate more purchases through the online channel. The analysis by Etminani-Ghasrodashti & Hamidi (2020) allowed us to conclude that individuals whose professional status is unemployed resort to physical stores less frequently.

The choice of the purchase channel also depends on the individual's attitude towards the product he intends to purchase, Lee et al. (2017) found that individuals who feel greater enthusiasm when shopping tend to frequent physical stores, while online shopping tends to be driven by utilitarian motivations, ie, with a task-fulfillment attitude (Wolfenbarger & Gilly, 2001). Zhen et al. (2016) concluded that the greater the individual's cost awareness, the lower the frequency of purchase in physical stores of fashion and electronics products, in addition, Cao et al. (2012) found that an attitude of Awareness of cost and impulsivity tends to increase the frequency of searching for information via the internet. Impulsive consumers tend to generate visits to physical stores (Cao et al., 2012). According to Zhen et al.

(2016), temporal awareness is negatively associated with the frequency of purchase of electronic and fashion products in physical stores. In the field of fashion products, time awareness also has a negative influence on online shopping.

Despite the multiple advantages associated with the expansion of the internet, a range of vulnerabilities and not-so-positive consequences also influence the purchase decision. For example, Tandon, Kiran, & Sah (2018) found that the risk perceived in the online purchase process has a negative influence on the satisfaction associated with online commerce, which in turn could influence the purchase intention. Perceived risk, which is defined by an individual's perception of the risks associated with the use of a certain technology (Verkijika, 2018) can be differentiated by typologies, ie the perceived risk is considered a multidimensional construct that is significantly influenced by different types risk, namely performance, privacy, financial and social risk (Tandon et al., 2018). Kim et al. (2019) investigated the determinants of demand behavior and concluded that when consumers perceive risk in the act of online purchase, they tend to substantially increase demand in physical stores, as well as increase demand in online stores with the objective to reduce that risk. Additionally, anxiety generated by the use of technology may also be an inhibiting factor (Faqih, 2016).

3. Methodology

3.1. Data Analysis

Through the statistical method Partial Least Squares - Structural Equation Model (PLS-SEM), we explore the relationships between the physical platform and the online platform, during the purchase process (search and purchase of the product) and the respective determining factors for use of each platform, for each type of product.

To perform the PLS-SEM analysis we use the Smart PLS software. The use of PLS-SEM has advantages that make this statistical method the best fit for the present study, such as: 1) It allows testing more complex relationships, where the models have multiple constructs and indicators; 2) PLS-SEM allows the use of different types of variables: metric, quasi-metric and categorical; 3) It does not require the sample size of the analysis to be large (Jr. Hair, M. Hult, Ringle, & Sarstedt, 2017).

3.2 Data collection and Variables

This study aims to identify the effect of e-commerce on the frequency of purchases in physical retail stores, as well as to explore the relationship between the two platforms and the respective determinants of their use for two different types of products: fashion and electronic products, during the purchase process, involving the product search phase and the completion of the purchase. To respond to the proposed objectives, an online questionnaire was developed on the Qualtrics platform, distributed via a shareable link on social networks such as Facebook, Whatsapp and Reddit, during the month of November 2020. The adoption of commerce online and the interaction between the two platforms may be influenced by the level of accessibility to retail centers (Weltevreden & Rietbergen, 2007), for this reason, it was decided to limit the study to individuals who live in the Metropolitan Area of Lisbon, Portugal, over 18 years.

In order to explore how the emergence of online commerce has impacted the way we behave as consumers, the following questions were asked to respondents "How has the frequency with which I shop changed, after the emergence of online commerce?" and "After the emergence of online commerce, my trips to physical stores:", questions adapted from (K. Shi et al., 2019), where five response options were presented to respondents: (1) Substantially decreased; (2) Decreased; (3) It has not changed; (4) Increased; (5) Increased substantially.

To analyse the purchasing behaviour of respondents, they were asked about the frequency of purchase and search on the two platforms, physical stores, and online stores, for each type of product (fashion and electronic products). Thus, for each type of product, the following questions were asked: How often do you purchase [type of product under review] on the Internet? How often do you purchase [type of product under review] in physical stores? How often do you look for [type of product under review] on the Internet? How often do you look for [type of product under review] in physical stores? Most studies use 5-value scales in which the options ranged from "never" to "more than once a week" (Cao et al., 2012; Lee et al., 2017), however, given the expected low frequency of purchase for the types of product under study, we considered it beneficial to expand the time interval and, for this reason, we chose to apply the 7-value scale used by Etmiani-Ghasrodashti & Hamidi (2020): (1) Rarely; (2) Three to four times a year; (3) Once every 2 months; (4) Once a month; (5) Twice a month; (6) Three times a month; (7) More than 4 times a month.

Based on demographic variables, attitude variables, perceived risk, and technological anxiety, we carried out a characterization of individuals who use different purchase channels, at different purchase stages, with greater or lesser frequency.

3.3 Sample characterization

The questionnaire counted 220 responses of which 199 are considered valid according to the target population criteria. As shown in table 1, in sociodemographic terms, the sample covered is characterized by 54% females and 45% males. The level of education acquired by most respondents refers to a degree or higher level (66%) and about 62% report their professional status as a “worker”. Most people consider the perception of personal income acquired to be positive, since 87% of respondents consider that the closest descriptions are “current income allows you to live comfortably” or “current income is enough to live on”.

Table 1:
characterization of

Factors	Categories	#	%
Gender	Female	108	54%
	Male	90	45%
	Other	1	1%
Age	From 18 to 35	102	51%
	More than 35	97	49%
Education Level	High School or lower level	68	34%
	Bachelor Degree or higher level	131	66%
Employment Status	Student	40	20%
	Student Worker	22	11%
	Work	124	62
	Unemployed	6	3%
	Retired	7	4%
Purchasing Power Perception	Live comfortably	88	44%
	You can live	86	43%
	Hard to live	18	9%
	Very hard to live	7	4%

Demographic
the sample.

		Fashion		Electronics	
		#	%	#	%
How often do you buy products on the internet?	Rarely	114	57%	115	58%
	Three to four times a year	40	20%	45	23%
	Once every 2 months	22	11%	25	13%
	Once a month	16	8%	10	5%
	Twice a month	6	3%	0	0%
	Three Times at month	1	1%	2	1%
How often do you buy products in physical stores?	More than 4 times a month	0	0%	2	1%
	Rarely	33	17%	79	40%
	Three to four times a year	62	31%	93	47%
	Once every 2 months	42	21%	13	7%
	Once a month	38	19%	6	3%
	Twice a month	13	7%	4	2%
How often do you look for products on the internet?	Three Times at month	7	4%	0	0%
	More than 4 times a month	4	2%	4	2%
	Rarely	74	37%	51	26%
	Three to four times a year	27	14%	48	24%
	Once every 2 months	15	8%	18	9%
	Once a month	18	9%	25	13%
How often do you look for products in physical stores?	Twice a month	19	10%	18	9%
	Three Times at month	15	8%	9	5%
	More than 4 times a month	31	16%	30	15%
	Rarely	37	19%	64	32%
	Three to four times a year	51	26%	74	37%
	Once every 2 months	37	19%	26	13%
	Once a month	25	13%	15	8%
	Twice a month	29	15%	10	5%
	Three Times at month	10	5%	4	2%
	More than 4 times a month	10	5%	6	3%

Table 2: Shopping behaviour's characterization of the sample.

In the field of fashion products, we found that only 23% of the sample purchased products on online platforms at least once every two months, while on physical platforms the value rises to 52%. Regarding the search for information, the percentage of individuals who search at least once every two months is identical on both platforms – 56% on physical platforms and 49% on online platforms. Contrary to what is seen in the process of purchasing fashion products, from the perspective of electronic products, it is the process of searching for information where the biggest difference between platforms is identified - while on the physical platform, only 31% of respondents report seeking at least once every two months electronic products, on the online platform this percentage increases to 50%. Regarding the purchase of products, the difference between the percentage of respondents who purchase products at least once every two months on different platforms is not substantial - 14% on physical platforms and 20% on platforms

4 Results

Since the objective refers to maximizing the explained variance of each endogenous latent variable of the model, it is important that, previously, an evaluation of the quality of the measurement model and the structural model takes place, focused on the metrics that provide the predictive capacity of the model (Jr. Hair et al., 2017).

4.2 Evaluation of the Measurement Model

In the models under analysis, the set of latent variables of attitude, perceived risk and technological anxiety are characterized by reflective model constructs, while the others are measured by a single indicator, as they measure observable characteristics (Jr. Hair et al., 2017).

The evaluation of the measurement models began with the test of the convergent validity of the reflective model. This test aims to analyse the level of correlation between the indicators and the underlying theoretical construct and thus ensure that the indicators significantly reflect the construct (Straub & Gefen, 2004). This evaluation presupposes the validation of the Composite Reliability (CR), Indicator Reliability and Average Variance Extracted (AVE) criteria.

Indicator Reliability is the dimension of the outer loadings associated with each indicator, the greater its value, the greater the variance explained in the construct, thus the outer loadings of each indicator must be greater than 0.708. Considering that the value of the squared outer loading represents the explained variance between the construct and the indicator, it must be equal to or greater than 0.5 ($0.708^2 = 0.5$).

Outer Loadings – Fashion Model	
Shopping Attitudes	
Enthusiasm	
ENT1	0.656
ENT2	0.835
ENT3	0.875
Cost Awareness	
COS1	0.745
COS2	0.899
COS3	0.905
Time Awareness	
TIM1	0.121
TIM2	0.960
Impulsiveness	
IMP1	0.884
IMP2	0.892
Innovation	
INOV1	0.848
INOV2	0.943
Store Relevance	
STO1	0.836
STO2	0.836
Risk Perception	
Payment	
PAY1	0.907
PAY2	0.872
PAY3	0.888
Privacy	
PRIV1	0.846
PRIV2	0.925
PRIV3	0.917
Operational	
OPER1	0.759
OPER2	0.913
OPER3	0.745
OPER4	0.675
Technological Anxiety	
ANX1	0.909
ANX2	0.883
ANX3	0.850

Outer Loadings – Electronics Model	
Shopping Attitudes	
Enthusiasm	
ENT1	0.526
ENT2	0.709
ENT3	0.847
Cost Awareness	
COS1	0.816
COS2	0.858
COS3	0.849
Time Awareness	
TIM1	0.694
TIM2	0.916
Impulsiveness	
IMP1	0.889
IMP2	0.822
Innovation	
INOV1	0.587
INOV2	0.761
INOV3	0.756
Store Relevance	
STO1	0.678
STO2	0.971
Risk Perception	
Payment	
PAY1	0.908
PAY2	0.856
PAY3	0.886
Privacy	
PRIV1	0.846
PRIV2	0.924
PRIV3	0.913
Operational	
OPER1	0.766
OPER2	0.918
OPER3	0.755
OPER4	0.669
Technological Anxiety	
ANX1	0.893
ANX2	0.875
ANX3	0.876

Table 3: Outer Loadings of the fashion and electronics' models

Although, in certain circumstances it is advantageous to use only a single indicator to measure a construct, namely when one intends to measure a observable variable (Bergkvist & Rossiter, 2007), most of the marketing literature recommends the use of multiple indicators in measuring more complex and abstract phenomena, such as behavioural variables (Petrescu, 2013). Following the outer-loadings criterion, the temporal awareness constructs (in both models) and the store relevance construct (in the electronics model) would be limited to only one indicator, which could jeopardize the reliability of the analysis (Jr. Hair et al., 2017) and for this reason, the Temporal Consciousness construct was excluded from the fashion products and electronic products model and the Store Relevance construct was excluded from the Electronic products model.

To verify the existence of internal consistency, we use the Composite Reliability criterion. In the case of exploratory studies, the values associated with the criterion will be considered acceptable if they vary between 0.6 and 0.7, in the case of more advanced studies, values between 0.7 and 0.9 are required in order to be considered satisfactory (Fornell & Larcker, 1981; Straub & Gefen, 2004).

The Average Variance Extracted (AVE) criterion indicates, on average, how much the construct explains the variance of its respective indicators. The construct is expected to explain more than half (0.5) of the variance of its respective indicators (Fornell & Larcker, 1981). Values below 0.5 indicate that, on average, more error remains in the indicators than the variance explained by the construct. It is confirmed that both models under analysis fully respect both the AVE and Composite Reliability criteria.

Fashion Model		
Variables	Composite Reliability	AVE
Attitude Variables		
Enthusiasm	0.924	0.858
Cost Awareness	0.888	0.727
Impulsiveness	0.882	0.789
Innovation	0.888	0.799
Store Relevance	0.826	0.704
Risk Perception		
Payment	0.914	0.781
Privacy	0.923	0.801
Operational	0.871	0.695
Technological Anxiety	0.913	0.778

Electronic Model		
Variables	Composite Reliability	AVE
Attitude Variables		
Enthusiasm	0.817	0.691
Cost Awareness	0.879	0.707
Impulsiveness	0.846	0.733
Innovation	0.764	0.620
Risk Perception		
Payment	0.914	0.781
Privacy	0.923	0.801
Operational	0.871	0.695
Technological Anxiety	0.913	0.777

Table 4: Composite Reliability and AVE of the fashion and electronics' models

In the second phase of the validation of the reflective model, Discriminant Validity was tested – an extension that validates whether each construct is unique and captures unique phenomena that are not captured by any other construct (Jr. Hair et al., 2017). In order to assess Discriminant Validity, three measures were used: (1) the indicator's outer loadings, where the indicator loadings under the associated construct should be higher than the same loadings on other constructs than the associated one (cross-loadings) , if the weight of an indicator is higher in a construct other than the respective one, it is beneficial to reconsider the adequacy of the indicator since it is not clear as to the phenomenon it reflects (Chin, 1998) – see annex (1) and (2); (2) The Fornell-Larcker implies that the square root of the AVE criterion of each construct must be greater than its highest correlation with any other construct, that is, it assumes that the construct in question shares more variance with the respective indicators than with the remaining constructs (Jr. Hair et al., 2017).

4.3 Evaluation of the Structural Model

After the validation of the measurement model, the validation of the structural model follows. The evaluation process of the structural model started by identifying the presence of multicollinearity in the constructs through the Variance Inflation Factor (VIF) criterion, the value of this measure should be greater than 1 and less than 5 so that there are no problems related to multicollinearity (Kock & Lynn, 2012). The values obtained for both models are considerably far from the critical values, so it is confirmed that the results achieved do not reflect multicollinearity problems for the present study.

The relevance of the significance of the path coefficients was evaluated. Path coefficients can be interpreted by Beta coefficients standardized in Ordinary Least Squares regression (Henseler, Ringle, & Sinkovics, 2009), the resulting values represent the estimated change in the endogenous construct by each unit of variation in the exogenous construct. Thus, the bootstrapping method was used in the evaluation of path coefficients, with 5000 re-sample samples in which each sample consists of 199 observations, and a critical value for a two-tailed test of 1.96, which corresponds to a level of 5% significance.

4.4 E-commerce impact

According to table 5, approximately 44% of respondents reveal that the emergence of online commerce resulted in a reduction in their travel to physical stores, reflecting an effect of replacing the face-to-face channel with the online channel. However, the percentage of respondents who declare that the frequency of their trips to physical stores were not impacted by the effect of online commerce refers to 56%. The results show that, although the neutral effect predominates among most cases under analysis, the weight of individuals who reduced their trips to physical stores is still significant.

Impact	N	%
Substantially decreased	15	8%
Decreased	71	36%
It has not changed	111	56%
Increased	2	1%
Increased Substantially	0	0

Total	199	100%
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Table 5: Impact of e-commerce on the frequency of visits to physical stores.

To the question "How has the frequency with which I shop changed, after the emergence of online commerce?" most respondents reported no changes (58%), however, approximately 34% of individuals report having increased the total frequency of purchases after the appearance of e-commerce.

Impact	N	%
Substantially decreased	4	2%
Decreased	13	7%
It has not changed	115	58%
Increased	60	30%
Increased Substantially	7	4%
Total	199	100%

Table 6: Impact of online commerce on total purchase frequency.

4.5 Interactions between purchasing platforms and determinant factors

The results show that young females are more likely to look for product information in online stores. Regarding the frequency of purchases in an online channel, the results indicate that individuals with less purchasing power tend to generate a greater number of purchases ($\beta = -0.124; p < 0.05$), contrary to what was concluded by (Etminani-Ghasrodashti & Hamidi, 2020; Xi et al., 2018; Zhen et al., 2016) who argue that individuals who earn a higher income tend to generate more interactions with the online shopping channel. In terms of attitude, the analysis allows us to conclude that a higher frequency of searching for information on the Internet is positively associated with a higher level of enthusiasm ($\beta = 0.282; p < 0.05$) and cost awareness ($\beta = 0.143; p < 0.01$), while those looking for information in physical stores more frequently have, equally, a high level of enthusiasm for the product ($\beta = 0.215; p < 0.01$) and like to innovate in relation to new fashions and new brands ($\beta = 0.184; p < 0.01$). Thus, we can infer a clear impact of the attitude variables on the constructs related to the frequency of search for information, as opposed to the impact shown on the purchase frequency variables. Anxiety associated with the use of technology in the online shopping process has a negative impact on purchases on an online platform ($\beta = -0.152; p < 0.05$) and an inverse impact on the frequency of purchases on physical platforms ($\beta = 0.176; p < 0.05$).

Additionally, the higher the frequency of searching in physical stores, the greater the frequency of searching in online stores ($\beta = 0.308; p < 0.01$) and the frequency of purchases in physical stores ($\beta = 0.675; p < 0.01$). The higher the frequency of searching in online stores, the greater the frequency of searching in physical stores ($\beta = 0.377; p < 0.01$) and the frequency of shopping in online stores ($\beta = 0.46; p < 0.01$).

	Online Search Frequency			In-Store Search Frequency			Online Buying Frequency			In-Store Buying Frequency			Risk Perception		
	$R^2 = 0.52$ $Q^2 = 0.347$			$R^2 = 0.328$ $Q^2 = 0.315$			$R^2 = 0.441$ $Q^2 = 0.360$			$R^2 = 0.613$ $Q^2 = 0.528$			$R^2 = 0.438$ $Q^2 = 0.334$		
	Path Coefficient	p-value	Sign. level	Path Coefficient	p-value	Sign. level	Path Coefficient	p-value	Sign. level	Path Coefficient	p-value	Sign. level	Path Coefficient	p-value	Sign. level
Attitude Variables															
Enthusiasm	0.282	0	***	0.215	0.015	**	0.091	0.235	NS	-0.022	0.719	NS			
Cost Awareness	0.143	0.022	**	-0.082	0.24	NS	0.014	0.825	NS	-0.037	0.461	NS			
Impulsiveness	0.080	0.266	NS	0.043	0.602	NS	0.088	0.279	NS	0.122	0.056	*			
Innovation	0.039	0.599	NS	0.184	0.009	***	0.024	0.72	NS	-0.056	0.309	NS			
Store Relevance	0.118	0.056	*	0.008	0.908	NS	-0.003	0.966	NS	0.032	0.544	NS			
Demographic Variables															
Gender	-0.164	0.012	**	-0.024	0.715	NS	0.030	0.656	NS	-0.028	0.692	NS			
Age	-0.280	0	***	0.039	0.558	NS	-0.057	0.411	NS	0.114	0.056	*			
Level of education	0.036	0.574	NS	-0.046	0.494	NS	-0.021	0.708	NS	0.021	0.728	NS			
Student	-0.034	0.695	NS	0.119	0.314	NS	-0.090	0.295	NS	-0.087	0.439	NS			
Student/Worker	0.028	0.698	NS	0.005	0.962	NS	0.069	0.405	NS	-0.078	0.336	NS			
Worker	0.141	0.098	*	0.029	0.807	NS	-0.004	0.957	NS	-0.104	0.352	NS			
Purchasing Power	-0.012	0.844	NS	-0.076	0.226	NS	-0.124	0.035	**	-0.029	0.541	NS			
Technological Anxiety	-0.17	0.02	**	0.011	0.904	NS	-0.152	0.049	**	0.176	0.023	**			
Risk Perception	-0.018	0.79	NS	-0.056	0.44	NS	-0.013	0.857	NS	-0.086	0.299	NS			
Payment	-	-	-	-	-	-	-	-	-	-	-	-	0.340	0	***
Privacy	-	-	-	-	-	-	-	-	-	-	-	-	0.084	0.316	NS
Operational	-	-	-	-	-	-	-	-	-	-	-	-	0.303	0	***
Online Buying Frequency	-	-	-	-	-	-	-	-	-	0.051	0.541	NS			
In-store Buying Frequency	-	-	-	-	-	-	0.074	0.551	NS	-	-	-			
In-store Search Frequency	0.308	0	***	-	-	-	0.012	0.883	NS	0.675	0	***			
Online Search Frequency	-	-	-	0.377	0	***	0.46	0	***	0.089	0.386	NS			

Note: NS= No Significant; * p<0,10; ** p<0,05; *** p<0,01

Table 7: Statistical relevance of the Fashion Products model.

As shown in Table 8, the model indicates that male individuals are more likely to look for information ($\beta=0.362$; $p<0.01$) and purchase the products on the internet ($\beta=0.149$; $p<0.05$), in addition, younger individuals tend to search for information on online platforms ($\beta=-0.172$; $p<0.01$). In terms of professional status, consumers whose professional status is a student, student worker or worker do not tend to purchase this type of product in physical stores. In terms of attitude variables, the proposed model allows us to conclude that individuals who tend to make more impulsive purchases prefer the online channel to buy ($\beta=0.211$; $p<0.01$) and the frequency of search for information about the products on the Internet is positively associated with an attitude of enthusiasm ($\beta=0.326$; $p<0.01$), cost awareness ($\beta=0.159$; $p<0.1$) and impulsiveness ($\beta=0.128$; $p<0.1$).

Additionally, the higher the frequency of searching in physical stores, the greater the frequency of searching in online stores ($\beta=0.269$; $p<0.01$) and the frequency of purchases in physical stores ($\beta=0.51$; $p<0.01$). The higher the frequency of searching in online stores, the greater the frequency of searching in physical stores ($\beta=0.421$; $p<0.01$) and the frequency of shopping in online stores ($\beta=0.332$; $p<0.01$).

	Online Search Frequency			In-Store Search Frequency			Online Buying Frequency			In-Store Buying Frequency			Risk Perception		
	$R^2 = 0.52$ $Q^2 = 0.347$			$R^2 = 0.328$ $Q^2 = 0.315$			$R^2 = 0.441$ $Q^2 = 0.360$			$R^2 = 0.613$ $Q^2 = 0.528$			$R^2 = 0.438$ $Q^2 = 0.334$		
	Path Coefficient	p-value	Sign. level	Path Coefficient	p-value	Sign. level	Path Coefficient	p-value	Sign. level	Path Coefficient	p-value	Sign. level	Path Coefficient	p-value	Sign. level
Attitude Variables															
Enthusiasm	0.326	0	***	-0,056	0,556	NS	0,068	0,34	NS	0,007	0,928	NS	-	-	-
Cost Awareness	0.159	0.065	*	-0,082	0,375	NS	0,029	0,708	NS	0,003	0,974	NS	-	-	-
Impulsiveness	0.128	0.054	*	0,088	0,285	NS	0,211	0,001	***	0,044	0,563	NS	-	-	-
Innovation	0.067	0.346	NS	0,077	0,442	NS	-0,075	0,358	NS	0,045	0,629	NS	-	-	-
Demographic Variables															
Gender	0.362	0	***	-0,03	0,757	NS	0,149	0,011	**	0,067	0,415	NS	-	-	-

Age	-0.172	0.005	***	-0,032	0,678	NS	0,036	0,604	NS	-0,051	0,462	NS	-	-	-
Level of education	0.035	0.596	NS	-0,077	0,299	NS	0,095	0,142	NS	-0,117	0,08	*	-	-	-
Student	0.099	0.489	NS	0,075	0,586	NS	0,093	0,359	NS	-0,459	0,007	***	-	-	-
Student/Worker	0.159	0.139	NS	-0,101	0,301	NS	0,159	0,109	NS	-0,297	0,025	**	-	-	-
Worker	0.183	0.205	NS	0	0,998	NS	0,111	0,33	NS	-0,392	0,031	**	-	-	-
Purchasing Power	-0.006	0.918	NS	0,039	0,624	NS	-0,04	0,56	NS	0,064	0,309	NS	-	-	-
Technological Anxiety	-0.095	0.193	NS	0,064	0,389	NS	-0,081	0,319	NS	0,034	0,645	NS	-	-	-
Risk Perception	0.02	0.746	NS	0,016	0,841	NS	-0,051	0,505	NS	0,015	0,856	NS	-	-	-
Payment	-	-	-	-	-	-	-	-	-	-	-	-	0,362	0	***
Privacy	-	-	-	-	-	-	-	-	-	-	-	-	0,098	0,267	NS
Operational	-	-	-	-	-	-	-	-	-	-	-	-	0,283	0	***
Online Buying Frequency	-	-	-	-	-	-	-	-	-	0,053	0,597	NS	-	-	-
In-store Buying Frequency	-	-	-	-	-	-	0,051	0,611	NS	-	-	-	-	-	-
In-store Search Frequency	0.269	0	***	-	-	-	-0,021	0,835	NS	0,51	0	***	-	-	-
Online Search Frequency	-	-	-	0,421	0	***	0,332	0	***	-0,102	0,302	NS	-	-	-

Table 8: Statistical relevance of the Electronic Products model.

5 Discussion and conclusion

The aim of this study is to understand the impact of the emergence of online commerce in the retail sector, in the Metropolitan Area of Lisbon, for two different types of products: fashion products and electronic products. A descriptive analysis was carried out to determine the predominant impact on the community, followed by an SEM analysis that allowed for a deeper understanding of the interactions between the different channels and to characterize the customer profile that most uses each platform during the purchase process.

The results of the analysis suggest that, although most of the sample is resistant to the emergence of online commerce, there is a clear impact on the daily lives of Lisbon' residents. Approximately 44% of respondents claim to have decreased the frequency of trips to physical stores after the emergence of online commerce, in addition, 34% of respondents claim to have increased the total frequency of purchase. The results obtained reflect a greater traffic to online stores that result in a decrease in the need to travel to the physical store. Although in a lower proportion, the pattern identified here is similar to that found by K. Shi et al. (2019) who concluded that online commerce has a positive effect on demand in the retail sector.

For both products under analysis, the study shows us that the probability of completion of the purchase occurring on any of the platforms increases when the search for information occurs on the same platform, however, there is a greater tendency for the completion of the process to occur on the physical platform. Possibly justified by the level of product complexity, the probability of the customer remaining on the same platform during the electronics purchase process is marginally lower compared to the fashion product model. (Kim et al., 2019) found that low-complexity products do not require a high level of research, which, consequently, will make consumers prefer to simplify the purchase process and remain on a single platform during the same. In addition, (CTT - Correios de Portugal, 2020) concluded that, in Portugal, household appliances and electronic and computer equipment are the product categories that consumers most search online before purchasing in physical retail, the results obtained show clear evidence of use of more than one platform for this type of product. From the point of view of the pre-purchase process, the frequency of searching for information in online stores and the frequency of searching for information in physical stores are positively associated with each other, for both products, however, the search for information online it is more likely to be associated with trips to physical stores than the search for information in physical stores leads us to search for information online, as suggested by Cao et al. (2012) and Zhai et al. (2017). The data obtained show that the population of Lisbon frequently uses the online channel when searching for information, however, this is not the case when purchasing.

In the field of fashion product information search, individuals who look for online stores tend to be young women, with low level of technological anxiety and a high level of enthusiasm and cost awareness, while physical stores are more often sought by a profile of customer equally enthusiastic about the buying process and willing to innovate. At the time of purchase, individuals with less technological anxiety and less income are more likely to use the online platform more often, as opposed to those with greater technological anxiety who resort to physical stores.

Regarding the electronic products model, young males with a high level of enthusiasm for the purchase process tend to look for information in online stores, while men with a tendency to make unplanned decisions during the purchase process tend to generate a greater number of purchases via the online platform.

The completion of this study also allowed us to infer that, despite the perceived risk not being an influencing factor in the frequency of purchase and search for information on any of the platforms for the Lisbon population, it is substantially impacted by the payment and operational dimension. The risk of privacy does not have a relevant impact on the interviewees' perception of risk, which can be explained by the theory of the level of construction of psychological distance (CLT), which argues that the perception of privacy can be considered psychologically distant from what it is reflected in a tendency to postpone taking action when the individual is faced with an online purchase, whose benefits are characterized as more immediate, close and tangible (Bandara, Fernando, & Akter, 2020). Additionally, technological anxiety generated by the use of technology only presents itself as a relevant factor in the model of fashion products, which is consistent with the results achieved by Faqih (2016).

The differences between the purchase processes of electronic products and fashion products are clear, particularly the characterization of the users of each platform, it is therefore necessary to expand the diversity of products under analysis as well as the determining factors in the frequency of use of the platforms in future research. In a sector characterized by constant development, it is imperative to understand the wishes and needs of customers to anticipate behaviour and thus improve the consumer experience (Pina & Dias, 2021). This study contributes to the increment of information regarding the impact of online commerce in the retail sector in Lisbon, Portugal.

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