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The impact of coronavirus on consumer behaviour in supermarket goods

The use of retail platforms/applications

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Master Thesis presented as partial requirement for obtaining the Master's degree in Information Management

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THE IMPACT OF CORONAVIRUS ON CONSUMER BEHAVIOUR IN SUPERMARKET GOODS

THE USE OF RETAIL PLATFORMS/APPLICATIONS

by

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Master Thesis presented as partial requirement for obtaining the Master's degree in Information Management, with a specialization in Marketing Intelligence

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ABSTRACT

The pandemic leads the world today and changed the consumer behaviour in numerous ways. The consumers were almost forced to change their habits immediately. Regarding the world economy, the pandemic is heading towards a global recession since March 2020. In this master thesis the objective is to study the impact of coronavirus in the consumer behaviour, more precisely in the supermarket goods. It is presented an empirical study within a real e-commerce usage context. Data were analysed with SEM/PLS method. The results indicate that behavioural intention and risk have a positive and significant impact on behavioural use, i.e., they are determinants of intention to use retail e-commerce platforms.

KEYWORDS

COVID-19; consumer behaviour; e-commerce; supermarket goods; adoption model

RESUMO

Atualmente, a pandemia lidera e mudou o comportamento do consumidor de inúmeras maneiras. Os consumidores foram quase forçados a mudar imediatamente os seus hábitos. Relativamente à economia mundial, a pandemia está a caminhar para uma recessão global desde Março de 2020. Nesta dissertação, o objetivo é estudar o impacto do coronavírus no comportamento do consumidor, mais precisamente nos produtos de supermercado. É apresentado um estudo empírico dentro de um contexto real de utilização do comércio eletrónico. Os dados foram analisados com o método SEM/PLS. Os resultados indicam que a intenção comportamental e o risco têm um impacto positivo e significativo na utilização comportamental, ou seja, são determinantes para a intenção de utilizar plataformas de comércio eletrónico de retalho.

PALAVRAS-CHAVE

COVID-19; comportamento do consumidor; comércio eletrónico; bens de supermercado; modelo adoção

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LIST OF ABBREVIATIONS AND ACRONYMS

BI	Behavioural Intention
BU	Behavioural Use
CA	Cronbach's Alpha
EcoR	Economic Risk
EE	Effort Expectancy
FC	Facilitating Conditions
GEN	Gender
H	Habit
HM	Hedonic Motivation
HTMT	Heterotrait-Monotrait Ratio
IS	Information Systems
PE	Performance Expectancy
PhyR	Physical Risk
PLS	Partial Least Squares
PsyR	Psychological Risk
PV	Price Value
SE	Self-efficacy
SEM	Structural equation modeling
SI	Social Influence
UTAUT	Unified theory of acceptance and use of technology
WHO	World Health Organization

1. INTRODUCTION

The COVID-19 is an acute respiratory disease, which has spread throughout the world, causing a worldwide pandemic. The disease was identified in Wuhan, Hubei province, China, which reported cases of coronavirus to the WHO, World Health Organization, on December 31, 2019 (Phelan and Gostin, 2020). Coronavirus has spread across 213 countries around the world at the end of May 2020. Preventive measures have been suggested by the WHO to avoid the continuous increase of cases such as mask and hand hygiene practices (Kaur and Singh, 2020). The consumers were almost forced to change their habits immediately. Regarding the world economy, the pandemic is heading towards a global recession since April 2020 (Habel et al., 2020). Accompanied by this problem, and one of its consequences is that it has caused more than 25% reduction in labour availability, which may intensify food shortages in the world and lead to more considered choices when going to the supermarket. Consumers, during the pandemic, want to protect themselves and for this they adopt healthy diets, which can lead to shortages of some foods (Galanakis, 2020). A study conducted by 'Accenture' in April 2020 concluded that consumer behaviour during the pre- pandemic period is changing. Consumers are changing their habits and are more focused on the products they consider essential (Kaur and Singh, 2020).

In the context of other studies, the main aspects that have been explored were what influences the consumer behaviour, considering the COVID-19. These studies have been focused on the impact of the factors as social distance and the income variation of the consumers with the COVID-19, however it has not yielded sufficiently data related to all these factors associated with the supermarket goods (Di Crosta et al., 2021).

For this study it is necessary to understand what has affected and affects the consumer behaviour and realize what consumption habits of supermarket goods are observed, in the context of the pandemic COVID-19, aiming to respond to the following question: What is the impact of coronavirus on consumer behaviour in supermarket goods?

In order to answer this research question there were formulated the following research objectives:

1. Understand the main retail theories for supermarket points of sale.

2. Identify the determinants that affect consumer behaviour in supermarket.

3. Purpose a theorical model to explain consumer behaviour change.

4. Empirical validation of the model.

Regarding the methodological approach of this study, it is necessary to propose a theoretical model that explains consumer behaviour in the context of the COVID-19 pandemic. The proposed model will be empirically validated, meaning that a questionnaire will be realized, in a certain context and later its analysis. To be able to validate the proposed model, a structural equation model will be used, using PLS, Partial Least Squares, in order to make use of various hypotheses and analyse them according to this theory. With PLS it is possible to obtain information about the impact relation between variables

that may eventually justify the impact of COVID-19 on consumer behaviour in supermarket products. By analysing this impact relation, it will be possible to see which factors are the most relevant and have the most impact on this behaviour, considering this study.

The contributions of the study are twofold. The first refers to the identification of the determinants for the adoption of retail platforms/applications, during COVID-19. The second refers to the model, which indicates that the approach followed, explains 81.3% of behavioural intention.

The chapter 2 presents the theoretical background, followed by chapter 3, where a model for investigating the impact of COVID-19 on consumer behaviour is proposed. Then, the way the empirical study was conducted is presented, and the results of the study are presented in chapter 4. In the last chapters, 5 and 6, the discussion and conclusions are presented.

2. THEORETICAL BACKGROUND

There are several studies regarding consumer behaviour. In order to better understand this purchase intention, it is more advantageous to divide the supermarket products into groceries and non-food essential products, since there is a wide variety of products in the supermarket. In a pre-pandemic situation, the factors that influence the purchase of supermarket goods are based on three main pillars, the price of products, the quality of products (Chockalingam et al., 2016) and the use of online e-commerce platforms (Sreeram et al., 2017). Regarding the price of the products, consumers' purchase intention may vary depending on other related variables, such as brand, current promotions or family income, which help in the decision making of choosing a product compared to a similar one. In this sequence, several studies have proven that price affects and is one of the most important and relevant determinants on consumer buying behaviour, in a pre-pandemic perspective, in both types of products, groceries and non-food essential products (Auf et al., 2018). Considering the quality of the products it is important to mention that there are several factors that are related to quality. Generally, consumers, considered of quality conscious customers, consider that when buying products in a smaller store, they have less quality than compared with a supermarket and therefore these big surfaces tend to have more purchases. On the other hand, the so-called value conscious customers tend to buy in smaller stores because, from their point of view, they consider that these smaller stores, such as grocery stores, offer a higher quality, even if it means spending more (Chockalingam et al., 2016). From a perspective of consumer behaviour before the pandemic regarding supermarket products it is a fact that has changed. However, even before COVID-19, it was already quite frequent the use of online platforms to make the necessary purchases. However, it is a completely different concept of shopping than usual (Sreeram et al., 2017). When analysing the literature regarding these two variables together, price and quality, it should be noted that the most satisfied customers and those who spend the most tend to be those with the highest income, by having the possibility to choose products with higher quality, regardless of price. On the other hand, customers with more limited income tend to be more concerned about prices. These customers are looking for reasonable prices and promotions (Moutinho et al., 2001).

Government restrictions resulting from the COVID-19 pandemic affected, and are still affecting, the retail sector. However, the total retail trade volume recovered after the critical months of the pandemic, however, the source of the volume does not only come from traditional trade, where e-commerce is prevalent. Due to COVID-19 retail stores have closed, distancing rules and other limitations such as movement restrictions have emerged, which impacted the retail sector. Consumer behaviour had to adjust to this new reality, which accelerated the trend that was already occurring in the sector (Beckers et al., 2021).

With the emergence of SARS-CoV-2 people have become aware of the risk and experience a self-protective response, where the threat triggers this protective behaviour. Self-efficacy is used by several studies to represent personal attitudes when dealing with a certain situation, such as the one experienced today with the pandemic (Chang, 2021). Having as objective to understand consumer behaviour it is necessary to analyse this factor, since Schwarzer (1992) describes self-efficacy as an important theory to understand the protective behaviours, regarding health, of the population, how they feel, think and act. A person with high self-efficacy tends to have more motivation and tends to accomplish goals they set themselves (Schwarzer, 1992). For example, in times of pandemic, a person

who has the goal of protecting him/herself from the virus will more easily take the necessary precautionary measures to achieve that end, such as not leaving home and shopping on the internet.

Nevertheless, with the pandemic, e-commerce emerged and made it possible for consumers with the use of retail applications/platforms to be able to fulfill their needs through this method. However, the risk of privacy, such as the security of payment information, has led to uncertainty in the use of these platforms (Farshidi, 2016). Besides that, consumers have created a concept of risk associated with COVID-19, whether psychological, physical and/or economic, which may explain the change, or not, of their behavior in the retail sector. This conception, risk perception, is addressed in several studies. However, not in the context of a pandemic. The first, psychological risk, is reported as a feeling of discomfort due to psychological factors, such as anxiety or fear. In the pandemic it can be related to crowds of people and close contact with others, which can cause this type of emotions. The second, physical risk, refers to when people are exposed to risk factors, such as viruses or physical injuries. The last one, economic risk, refers to the concern of consumers regarding the financial losses they may suffer, in this context, due to the pandemic, where it is possible for them to lose their jobs or reduce their working days and consequently reduce their salaries (Chang, 2021).

With the development of technology, e-commerce has become an increasingly used concept. With the arrival of COVID-19 and consequently all the resulting limitations, namely shop closures, led to an increase in online shopping, the preference for this commercial channel and the e-commerce boom, in general (Beckers et al., 2021). Consumers had no alternative but to buy certain products online and so it is expected that with the habit gained of using e-commerce applications and platforms, online shopping will increase more and more. The pandemic dramatically changed global trends and caused a rapid change in all businesses (Bhatti et al., 2020).

Venkatesh's 2012 theory is based on his 2003 theory made to measure technology use and acceptance. This theory, from 2003, was developed from eight theories/models based on technology use. Bringing these theories/models together led to the creation of the unified theory of technology acceptance and use (Venkatesh et al., 2003). UTAUT, in an organizational context, aims to study the prediction of the behavioural intention to use a technology and is supported by four constructs, social influence, facilitating conditions, performance expectancy and effort expectancy (Venkatesh et al., 2003). The UTAUT2, is an adapted version of the UTAUT, which has three more constructs, habit, hedonic motivation, and price value, important for perceiving the use of products and/or technologies, focused on a consumer context (Venkatesh et al., 2012).

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3. RESEARCH MODEL PROPOSAL

The research hypotheses described below supported the generation of the conceptual model, which was consequently developed from the literature review. In order to understand/measure the use of retail applications/platforms, the following constructs were included, adapted from Venkatesh (2012): Performance Expectancy, Social Influence, Facilitating Conditions, Habit, Effort Expectancy, Hedonic Motivation, Price Value, Behavioural Intention and Behavioural Use. Additionally, three more constructs were added: Risk, adapted from Chang (2021) and Self-Efficacy adapted from Hassan et al. (2020).

Table 1. Construct Operationalization

Construct	Acronym	Description	Author
Performance Expectancy	PE	Is the performance expectation that an individual will acquire from using a system, in this case retail platforms/applications	Davis (1989)
Social Influence	SI	Is the degree to which an individual considers important how others believe he or she should use a technology	Venkatesh et al. (2012)
Facilitating Conditions	FC	Is the degree to which an individual believes that organizational and technical infrastructure exist to support use of the IS	
Habit	H	Is the extent to which people tend to perform behaviours (use IS) automatically because of learning	
Effort Expectancy	EE	The extent to which a learner believes that using a system is free of effort	
Hedonic Motivation	HM	Hedonic motivation is defined as the fun or pleasure derived from using a technology	
Price Value	PV	Is the financial cost required to obtain and use a product, according to context	
Behavioural Intention	BI	Is defined as consumer readiness and likelihood to use mobile commerce services	Fong and Wong (2015)
Behavioural Use	BU	Is the frequency with which a person uses a certain technology	Venkatesh et al. (2012)
Risk	Risk	Individuals' psychological evaluations of the probability and consequences of an adverse outcome	Yıldırım and Güler (2020)
Psychological Risk	PsyR	The feeling of unease arising from some unsafe factors	Chang (2021)
Physical Risk	PhyR	The feeling of being exposed to some potential risk factors, such as virus, physical injury, unsafe working environment and to an inadvisable social distance	
Economic Risk	EcoR	The worry losing possible financial losses, such as company closure, reduced working days, poor revenue and salary reduction	
Self-efficacy	SE	The confidence in one's ability, knowledge, or skills to engage in a healthful behaviour	Vinnikova et al. (2020)

The performance expectancy is an important construct for behavioral intention in the UTAUT model and is the strongest indicator of intention and has demonstrated a positive impact of motivation regarding performance expectancy (Venkatesh et al., 2003). Other studies, related to applications/platforms, report that performance expectancy has a positive effect on behavioral intention, for example, regarding the acceptance of E-Banking Services (Ghalandari, 2012) and the intention to use e-commerce by the women entrepreneurs (Goswami and Dutta, 2017). The study developed by (O'Cass and Fenech, 2003) focusing on e-commerce, more specifically on web retailing adoption, endorses this significant impact on behavioral intention. Thus, we hypothesize the following:

Hypothesis 1. *The performance expectancy has a positive impact on the behavioural intention.*

According Venkatesh and Morris (2000), Venkatesh et al. (2000) and Hong et al. (2008) social influence is a factor that has proven to have a clear influence on behavioral intention. With the constant developments in technology, more specifically social networks, people tend to be heavily influenced by the groups that use them. Generally, it is the users, who have recently joined the technology, i.e., without enough experience, who influence new people to join, with advice or feedback (PHAN et al., 2020). Thus, we hypothesize the following:

Hypothesis 2. *The social influence has a positive impact on the behavioural intention.*

A consumer who is able to access facilitating conditions is more likely to acquire a higher intention to use a particular technology (Tam et al., 2018). Other investigations have affirmed that eventually, people with more technological experience may be more familiar with a particular technology, which makes dependence on external support reduced. Conversely, less experienced users are more dependent on facilitating conditions. These investigations show that facilitating conditions have a positive impact on behavioral intention (Ambarwati et al., 2020). Thus, we hypothesize the following:

Hypothesis 3. *The facilitating conditions has a positive impact on the behavioural intention.*

Previous investigations indicate that the habit is directly associated with the type of consumer and his or her behaviours in daily life. That is, if a consumer is less sensitive to change, he or she will depend, to determine his or her behaviour, on the established habit, which will mean that his or her previous habit patterns are not easily susceptible to change (Venkatesh et al., 2012). Based on this theory, and in this context, if a consumer uses retail applications/platforms more frequently, it is expected that they will have a better performance, promoting their intention to use the technology. Thus, we hypothesize the following:

Hypothesis 4. *The habit has a positive impact on the behavioural intention.*

With a higher expectation of effort, better performance is expected. In other words, effort expectancy has a direct effect on behavioural intention. Adapted to the context of this research, when users believe that a retail application/platform is useful, they might believe that the retail application/platform is difficult to use. So, they tend to have the idea that the effort for using these applications will be rewarded by the benefits it will bring (Tam et al., 2018). Thus, we hypothesize the following:

Hypothesis 5. *The effort expectancy has a positive impact on the behavioural intention.*

Venkatesh et al. (2012) considers hedonic motivation as an important factor in determining the acceptance and use of technology, in this context, retail applications/platforms. Accordingly, by increasing the pleasure that these platforms provide, users will likely continue to want to use them (Venkatesh et al., 2012). Thus, we hypothesize the following:

Hypothesis 6. *The hedonic motivation has a positive impact on the behavioural intention.*

When the advantages of using a technology are greater than the monetary cost, then the price value is positive (Venkatesh et al., 2012) and therefore the price value analysis is particularly relevant when consumers have to pay for technology, as in some cases in this research, which justifies the possibility of having a positive impact on the behavioral intention variable (Ramirez-Correa et al., 2015). Thus, we hypothesize the following:

Hypothesis 7. *The price value has a positive impact on the behavioural intention.*

According to previous investigations, it is expected that behavioral intention positively influences the use of a technology, i.e., so, it is also expected that higher intention leads to an increase in the use of a certain technology (Venkatesh et al., 2003). In these studies, several factors have been identified that can influence behavioral intention. In the theory of reasoned action (TRA), it is suggested that attitude and subjective norms are able to influence human behavioral intention (Fong and Wong, 2015). Thus, we hypothesize the following:

Hypothesis 8. *The behavioural intention has a positive impact on the behavioural use.*

Several studies affirm that there is a negative impact of perceived risk on users continued use of mobile shopping applications, i.e., that the associated risk, negatively impacts continued use of a particular mobile technology (Chopdar and Sivakumar, 2019). Thus, we hypothesize the following:

Hypothesis 9. *The risk has a negative impact on the behavioural use.*

Risk, according to the literature, has been measured in various approaches. According to Chang (2021) theory, which refers to the impact of social distancing in retail, Risk is assessed as a hierarchical construct. According to Wetzels et al. (2009), the usefulness of hierarchically constructed models is that they allow greater theoretical parsimony and reduce model complexity. Therefore, for this investigation, the risk variable will be proposed as a second-order reflective construct, composed by three lower-order variables, psychological risk, physical risk and economic risk, in the context of the impact of consumer behaviour in retailing. Thus, we hypothesize the following:

Hypothesis 10. *Risk is a second-order reflective construct that it is composed of psychological, physical and economical risks.*

Self-efficacy is an important theory when analysing people's behaviour regarding their health protection and is addressed in several studies. Multiple studies report that self-efficacy increases when people have sufficient risk awareness. However, it should be noted that even then, there is a negative correlation between self-efficacy and risk (Chang, 2021). Previous studies report that self-efficacy has a positive impact on behavioral intention to use mobile services as well as on behavioral use (Vinnikova et al., 2020). In this pandemic context, the action of going to the supermarket, with governmental limitations and the associated risk, may lead people to adopt new online platforms or simply continue to use them. Thus, we hypothesize the following:

Hypothesis 11a. *The self-efficacy has a positive impact on the behavioural intention.*

Hypothesis 11b. *The self-efficacy has a negative impact on the risk.*

Hypothesis 11c. *The self-efficacy has a positive impact on the behavioural use.*

Several studies, more focused on technological investigations, report that age has a positive impact on behavioral use and usage, meaning that as age increases, the continued use of these platforms and new memberships tend to increase (Sobti, 2019). On the other hand, some research indicates that age negatively affects risk, meaning that as age increases, the risk or the perception of risk of these people tends to decrease (Peng et al., 2019). Thus, we hypothesize the following:

Hypothesis 12a. *The age has a positive impact on the behavioural use.*

Hypothesis 12b. *The age has a negative impact on the risk.*

Other investigations, namely the technological ones, report that gender has a negative impact on behavioral intention, that is, whatever the gender, it does not affect the intention to use a certain platform (Perdigoto and Picoto, 2012). Thus, we hypothesize the following:

Hypothesis 13. *The gender has a negative impact on the behavioural intention.*
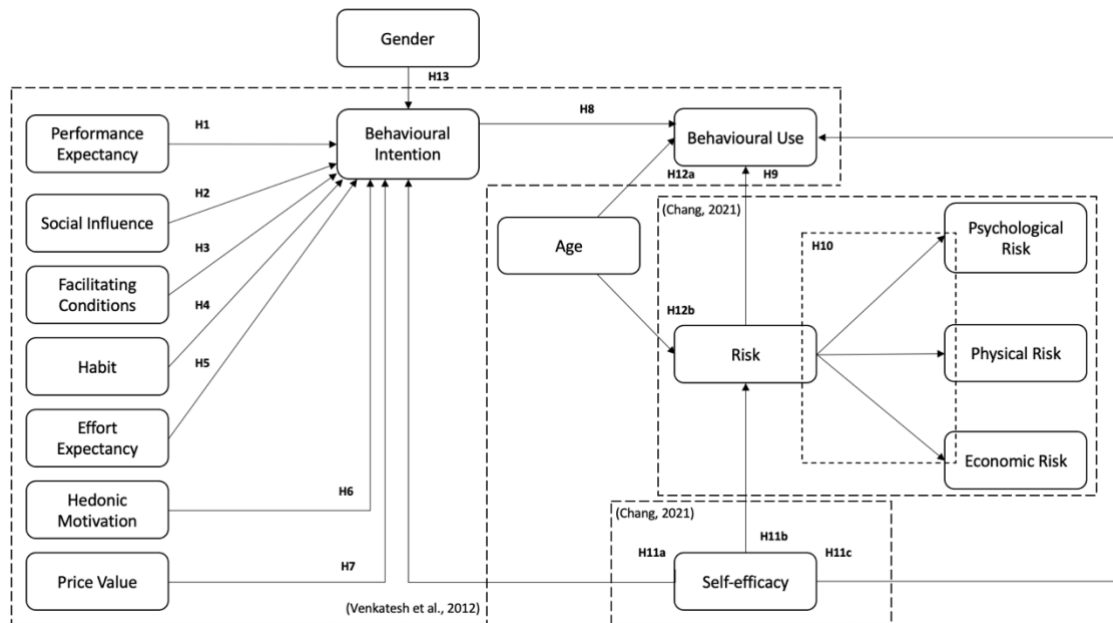
Figure 1. Consumer behaviour usage of retailing platforms, in a pandemic situation, research model

Figure 1 presents the proposed research model base in the information system adoption theory and also studying the impact of age, gender, perceived risk, and self-efficacy on intention to use e-commerce platforms in pandemic context.

4. EMPIRICAL STUDY RESULTS

The model was operationalized according with statistical tested scales (Measurement model - Appendix A). To be able to perform this study, a survey was randomly distributed using several digital platforms, during the months of August and September. First a pilot survey was conducted to analyse and verify if it needed improvement, however it remained unchanged and was used in this study. Regarding demographic data it was possible to verify that 85% of the respondents had a higher level of education (Bachelor's Degree (55.9%), Master's or Postgraduate (28.3%), PhD (0.8%)), with an average age of 42 years. Regarding the professional status, 88.3% of the respondents are employed and most of the questionnaire respondents are female (67.7%). All items were measured using a seven numerical point scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (7), except for the self-efficacy variable (Hassan et al., 2020) which was measured on a five numerical point scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (5).

The Structural equation modeling (SEM) method is a statistical methodology for testing and estimating relationships using statistical data and qualitative hypotheses. The SEM/Partial Least Squares (PLS) method was used to analyse the relationship and effects of the proposed model (Hair et al., 2011). This method and the use of PLS, which is the variance method, according to the literature, is considered appropriate for several reasons. Namely because it allows model testing and validating the causality of a structural model and because it allows empirically validating a non-normal distributed sample, which is the case (Hair et al., 2013). To perform the statistical tests was used the Smart PLS v.3.3.3 in order to analyze the relationships defined in the theoretical model (Ringle et al., 2015).

4.1. MEASUREMENT MODEL RESULTS

This sub-chapter includes the measurement analyses, namely the validity and reliability analysis and the discriminant validity analysis. The first was validated through Cronbach's Alpha (CA), used to assess the reliability of a set of scale or test items. These values, according to the literature, should be greater than 0.7, however, a range between [0.6; 0.7] is considered acceptable for exploratory purposes. All values met the criteria, as described in Table 2, below (Hair et al., 2011).

Table 2. Cronbach's Alpha criterion

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
AGE	1	1	1	1
BI	0,941	0,941	0,971	0,944
BU	0,922	0,924	0,945	0,811
EE	0,966	0,969	0,975	0,906
EcoR	0,95	0,951	0,968	0,909
FC	0,941	0,942	0,958	0,852
GEN	1	1	1	1
H	0,937	0,954	0,955	0,841
HM	0,949	0,951	0,967	0,908
PE	0,959	0,96	0,97	0,89
PV	0,971	0,972	0,981	0,946
PhyR	0,892	0,895	0,926	0,758
PsyR	0,957	0,96	0,969	0,888
Risk	0,94	0,944	0,949	0,629
SE	0,9	0,907	0,926	0,714
SI	0,988	0,989	0,992	0,977

A second analysis refers to the Fornell-Larcker, Cross Loadings and Heterotrait-Monotrait Ratio (HTMT) measures. The Fornell-Larcker criterion states that the square root of the AVE of each construct is greater than its correlation with another construct, which is verified, as shown in Table 3, below (Hair et al., 2011).

Table 3. Fornell-Larcker test results

	AGE	BI	BU	EE	EcoR	FC	GEN	H	HM	PE	PV	PhyR	PsyR	Risk	SE	SI
AGE	1															
BI	-0,246	0,972														
BU	-0,338	0,652	0,901													
EE	-0,376	0,73	0,575	0,952												
EcoR	-0,15	0,475	0,406	0,433	0,953											
FC	-0,293	0,636	0,418	0,804	0,284	0,923										
GEN	-0,007	-0,059	0,045	-0,038	-0,033	-0,036	1									
H	-0,249	0,846	0,718	0,692	0,579	0,544	0,001	0,917								
HM	-0,233	0,764	0,64	0,639	0,573	0,489	0,027	0,798	0,953							
PE	-0,265	0,85	0,635	0,759	0,503	0,59	-0,002	0,855	0,751	0,943						
PV	-0,316	0,776	0,601	0,71	0,423	0,655	-0,064	0,777	0,784	0,796	0,973					
PhyR	-0,145	0,432	0,401	0,383	0,509	0,379	-0,001	0,511	0,522	0,466	0,458	0,871				
PsyR	-0,318	0,46	0,497	0,413	0,612	0,287	-0,02	0,595	0,607	0,513	0,512	0,69	0,942			
Risk	-0,251	0,527	0,511	0,473	0,789	0,367	-0,019	0,652	0,659	0,573	0,544	0,858	0,92	0,793		
SE	0,016	0,274	0,231	0,286	0,133	0,381	-0,053	0,244	0,304	0,275	0,27	0,403	0,274	0,323	0,845	
SI	-0,249	0,649	0,535	0,546	0,551	0,416	0,012	0,742	0,732	0,748	0,683	0,539	0,565	0,639	0,191	0,989

The Cross Loadings criterion defends that all the loadings of each indicator should be greater than all cross-loadings, which, in a first instance, did not occur. Items BI2 and BU1 obtained higher results than expected and were therefore removed. Thus, after a re-estimation of the model, all constructs meet these criteria, as shown in Appendix B. The results analysed before were already observed with the elimination of these two items (Hair et al., 2011).

Furthermore, to confirm this analysis, discriminant validity, it is necessary to validate one more method, HTMT, which states that the observed value must be lower than 0.9 to indicate discriminant validity (Hair et al., 2011). This method was validated and confirmed, as shown in Table 4, however, as the risk variable is composed and defined by three variables, the values of the physical risk and psychological risk variables have values, supposedly not acceptable to satisfy this method, although, they are not significant, for this reason.

Table 4. Heterotrait-Monotrait Ratio (HTMT)

	AGE	BI	BU	EE	EcoR	FC	GEN	H	HM	PE	PV	PhyR	PsyR	Risk	SE	SI
AGE																
BI	0,254															
BU	0,351	0,699														
EE	0,383	0,763	0,608													
EcoR	0,153	0,503	0,433	0,45												
FC	0,3	0,674	0,447	0,843	0,299											
GEN	0,007	0,061	0,047	0,038	0,033	0,056										
H	0,26	0,889	0,769	0,717	0,623	0,566	0,021									
HM	0,238	0,807	0,683	0,663	0,605	0,513	0,044	0,849								
PE	0,271	0,894	0,674	0,786	0,528	0,619	0,017	0,897	0,787							
PV	0,32	0,811	0,635	0,731	0,44	0,683	0,064	0,815	0,816	0,825						
PhyR	0,152	0,472	0,442	0,415	0,546	0,42	0,035	0,566	0,563	0,503	0,491					
PsyR	0,323	0,483	0,526	0,426	0,641	0,3	0,024	0,637	0,637	0,536	0,53	0,741				
Risk	0,251	0,561	0,546	0,497	0,841	0,394	0,035	0,705	0,698	0,605	0,569	0,941	0,958			
SE	0,055	0,29	0,245	0,304	0,139	0,411	0,058	0,252	0,324	0,29	0,284	0,463	0,298	0,356		
SI	0,251	0,673	0,559	0,556	0,568	0,429	0,012	0,783	0,756	0,77	0,697	0,569	0,581	0,663	0,197	

4.2.   STRUCTURAL MODEL RESULTS

After the validity of the measurement model has been determined, the SEM/PLS method, states that the structural paths should be evaluated for the purpose of testing the developed hypotheses. So, it is necessary to understand the contribution of each indicator, presented in Table 5, below. This information is obtained with the bootstrapping method with 5000 subsamples, from the original data set (Hair, 2014).

Table 5. Hypotehses test results

			Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
AGE	→	BU	-0,167	-0,169	0,053	3,144	0,002
AGE	→	Risk	-0,256	-0,257	0,059	4,33	0
BI	→	BU	0,498	0,499	0,063	7,928	0
EE	→	BI	-0,037	-0,031	0,073	0,516	0,606
FC	→	BI	0,188	0,186	0,06	3,146	0,002
GEN	→	BI	-0,058	-0,058	0,027	2,125	0,034
H	→	BI	0,347	0,35	0,081	4,275	0
HM	→	BI	0,201	0,199	0,067	3,022	0,003
PE	→	BI	0,405	0,404	0,074	5,494	0
PV	→	BI	0,017	0,015	0,077	0,222	0,825
Risk	→	BU	0,195	0,193	0,061	3,19	0,001
Risk	→	EcoR	0,789	0,788	0,032	25,013	0
Risk	→	PhyR	0,858	0,858	0,019	46,352	0
Risk	→	PsyR	0,92	0,92	0,012	79,34	0
SE	→	BI	-0,029	-0,029	0,031	0,922	0,356
SE	→	BU	0,034	0,036	0,046	0,743	0,458
SE	→	Risk	0,327	0,328	0,057	5,742	0
SI	→	BI	-0,122	-0,123	0,051	2,4	0,016

The figure below shows the structural model that was estimated by using R², which represents the amount of the variance of a dependent variable that is explained by an independent variable. The R² of dependent variables are 0.813, 0.489, 0.17, 0.846, 0.737 and 0.623 for behavioural intention, behavioural use, risk, psychological risk, physical risk and economic risk, respectively. Significance was evaluated according to the bootstrapping criteria described in Table 5 (Hair, 2014).
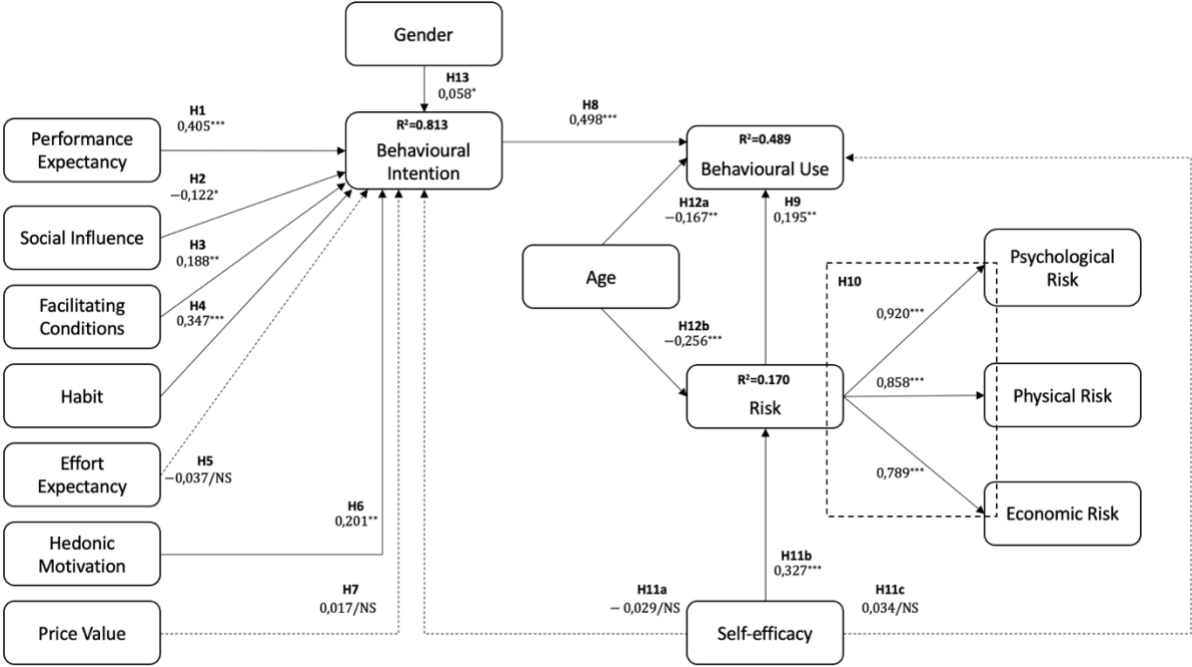

Figure 2. Consumer behaviour usage of retailing platforms, in a pandemic situation, structural model results

The model explains 81.3% of the variance in behavioural intention. Performance expectancy ($\hat{\beta} =$ 0.405; p < 0.001), social influence ($\hat{\beta} =$ -0.122; p < 0.1), facilitating conditions ($\hat{\beta} =$ 0.188; p < 0.05), habit ($\hat{\beta} =$ 0.347; p < 0.01), effort expectancy ($\hat{\beta} =$ -0.037; not significant), hedonic motivation ($\hat{\beta} =$ 0.201; p < 0.05), price value ($\hat{\beta} =$ 0.017; not significant), gender ($\hat{\beta} =$ 0.058; p < 0.1) and self-efficacy $\hat{\beta} =$ -0.029; not significant). Thus, hypotheses H1, H3, H4, H6 and H7 are confirmed and hypotheses H2, H5, H11a and H13 are not confirmed. The variables effort expectancy and price value are not significant (see Table 6).

The model explains 48.9% of the variance in behavioural use. Behavioural intention ($\hat{\beta} =$ 0.498; p < 0.01), risk ($\hat{\beta} =$ 0.195; p < 0.05), age ($\hat{\beta} =$ -0.167; p < 0.05) and self-efficacy ($\hat{\beta} =$ 0.034; p < not significant). Thus, hypotheses H8 and H11c are confirmed and hypotheses H9 and H12a are not confirmed. However, H8, H9 and H12c are statistically significant, while H11c is not (see Table 6).

The model explains 17% of the variance in risk. Self-efficacy ($\hat{\beta} =$ 0.327; p < 0.01) and age ($\hat{\beta} =$ -0.256; p < 0.01) are statistically significant. Hypothesis H12b is confirmed and hypothesis H11b is not confirmed. The dimensions that compose risk are all statistically significant. Psychological risk ($\hat{\beta} =$ 0.920; p < 0.01), physical risk ($\hat{\beta} =$ 0.858; p < 0.01) and economic risk ($\hat{\beta} =$ 0.789; p < 0.01). Therefore, H10 are confirmed (see Table 6).

Table 6. Hypotheses test results

Hypoteses	Variables			Findings	
H1	Performance Expectancy	⟶	Behavioural Intention	Positively & statistically significant ***	($\hat{\beta}$ = 0.405; p < 0.01)
H2	Social Influenece	⟶	Behavioural Intention	Negatively & statistically significant *	($\hat{\beta}$ = -0.122; p < 0.1)
H3	Facilitating Conditions	⟶	Behavioural Intention	Positively & statistically significant **	($\hat{\beta}$ = 0.188; p < 0.05)
H4	Habit	⟶	Behavioural Intention	Positively & statistically significant ***	($\hat{\beta}$ = 0.347; p < 0.01)
H5	Effort Expectancy	⟶	Behavioural Intention	Negatively & not statistically significant	($\hat{\beta}$ = -0.037; NS)
H6	Hedonic Motivation	⟶	Behavioural Intention	Positively & statistically significant **	($\hat{\beta}$ = 0.201; p < 0.05)
H7	Price Value	⟶	Behavioural Intention	Positively & not statistically significant	($\hat{\beta}$ = 0.017; NS)
H8	Behavioural Intention	⟶	Behavioural Use	Positively & statistically significant ***	($\hat{\beta}$ = 0.498; p < 0.01)
H9	Risk	⟶	Behavioural Use	Positively & statistically significant **	($\hat{\beta}$ = 0.195; p < 0.05)
H10	Risk	⟶	Psychological risk	Positively & statistically significant ***	($\hat{\beta}$ = 0.920; p < 0.01)
		⟶	Physical risk	Positively & statistically significant ***	($\hat{\beta}$ = 0.858; p < 0.01)
		⟶	Economic risk	Positively & statistically significant ***	($\hat{\beta}$ = 0.789; p < 0.01)
H11a	Self-efficacy	⟶	Behavioural Intention	Negatively & not statistically significant	($\hat{\beta}$ = -0.029; NS)
H11b	Self-efficacy	⟶	Risk	Positively & statistically significant ***	($\hat{\beta}$ = 0.327; p < 0.01)
H11c	Self-efficacy	⟶	Behavioural Use	Positively & not statistically significant	($\hat{\beta}$ = 0.034; NS)
H12a	Age	⟶	Behavioural Use	Negatively & statistically significant **	($\hat{\beta}$ = -0.167; p < 0.05)
H12b	Age	⟶	Risk	Negatively & statistically significant ***	($\hat{\beta}$ = -0.256; p < 0.01)
H13	Gender	⟶	Behavioural Intention	Positively & statistically significant *	($\hat{\beta}$ = 0.058; p < 0.1)

Notes: Path Coefficient $\hat{\beta}$: NS = not significant; * significant at p < 0.10; ** significant at p < 0.05; *** significant at p < 0.01 (Cohen, 1992)

5. DISCUSSION

The model presented explains 17% of the risk, approximately 49% of the use of retail platforms/applications and approximately 81% of the intention to use these platforms/applications. According to the literature, there were hypotheses that were confirmed and others that were not. Regarding the hypotheses supported by the Venkatesh et al. (2012) model, H1, H2, H3, H4, H5, H6 and H7, all were confirmed except for hypotheses H2 and H5, which correspond to the impact that the social influence and effort expectancy variables have on the behavioural intention variable. These variables have a negative impact on the behavioural intention variable. Both the effort expectancy variable, and the price value variable are not significant, unlike the others. These results can be explained by the context of this study, i.e., a pandemic context. Consumers being exposed to new prevention measures and being aware that social distance is important to fight the virus may consider that the use of retail applications/platforms is necessary for this to happen, not because society or other users use them, but because it is necessary to fight COVID-19. Therefore, consumers decide to use these platforms because of the perceived risk and not because of social influence. Regarding effort expectancy, which represents a negative and non-significant impact, it can be explained by the same reason. According to Tam et al. (2018), consumers think that the effort of using this technology will be rewarded by the benefit of it, however, in a pandemic context, consumers, to stay away from supermarket crowds, may feel that, independently of the effort, it is necessary to join these platforms to reduce the risk of contracting COVID-19.

In accordance with Vinnikova et al. (2020) and Perdigoto and Picoto (2012), hypotheses H11a and H13, respectively, are also not confirmed. H11a states that the self-efficacy variable has a negative and non-significant impact when explaining the behavioural intention variable. It can be explained, in a pandemic context, that people who are more confident in themselves and that they can protect themselves from the virus, may be more likely to physically go to supermarkets and not use retail platforms. The hypothesis H13 states that the variable gender has a positive and significant impact when explaining the behavioural intention variable. According to Perdigoto and Picoto (2012), independently of the gender, the influence on the intention to use these platforms is not affected, however, in this context, this hypothesis is not confirmed and effectively the gender has influence on the behavioural intention variable. One possible explanation is the fact that 67.7% of the respondents are female.

The hypotheses that were analysed in order to explain behavioural use were H8, H9, H11c and H12a, in which hypotheses H8 and H11c were confirmed, in conformity with the literature, and in which hypotheses H9 and H12a were not confirmed. 49.8% of the behavioural use variable is explained by the behavioural intention variable (H8), which goes in line with results obtained in previous studies (Fong and Wong, 2015; Aparicio et al., 2021). However, the self-efficacy variable (H11c) is in accordance with results from the literature, Vinnikova et al. (2020), however, it is not significant. The hypotheses associated with the variables risk and age were not confirmed but are significant. The reasons that may be associated with these results may be, for both age and risk, the pandemic context. The results obtained by the age variable (H12a) mean that as age increases, the use of these platforms tends to decrease. That is, consumers who are older, may tend not to be as susceptible to change and therefore continue to physically go to consumer places. Risk, according to the literature, negatively affected behavioural use (H9), but there was a positive and significant impact, which, in a pandemic

context, can be explained by the fact that if a consumer has a higher perception of risk, whether psychological, physical and/or economic, may tend to use retail platforms more frequently, when compared to other consumers with a lower perception of risk. Risk is a second-order reflective construct and is composed of psychological, physical and economic risk. According to the information acquired in the literature, this hypothesis, H10, is confirmed and is very significant to explain risk. The hypothesis corresponding to age (H12b) is also confirmed and is consistent with the literature, specifically with the Peng et al. (2019) study. However, the hypothesis H11b is not confirmed and is very significant to explain the risk. That is, the self-efficacy variable explains 32.7% of the risk variable. One reason for this hypothesis not being confirmed and presenting very positive results may be due to the fact that, considering the pandemic, a consumer with a high perception of risk may tend to adopt less risky, more thoughtful behaviours in order to protect themselves from the virus, which may lead to an increase of self-efficacy levels.

The variables age and gender were considered controllable at the beginning of the study. However, after analysing the impact of these variables, on the variables considered dependent, it was found that they are not and that they have a significant impact. In Table 5 it is possible to verify that the age variable explains the BU and risk variables and that the gender variable explains the BI variable, therefore, they were included in the model, with their respective hypotheses, described and explained, according to the literature.

6. CONCLUSIONS, IMPLICATIONS AND FUTURE WORKS

6.1. CONCLUSIONS

The main objective of this study is to understand if the pandemic originated by COVID-19 has an impact on consumer behavior, namely if retail platforms, and consequently e-commerce, had and has more adherence during the pandemic. To achieve this main goal, we studied the reality and proposed a model, which was validated through results obtained from consumers. The results show that our model explains 81.3% of behavioral intention, which is determined by performance expectancy, social influence, facilitating conditions, habit, hedonic motivation and gender. Our results also indicate that behavioral intention and risk have a positive and significant impact on behavioral use, i.e., they are determinants of the intention to use retail e-commerce platforms.

6.2. IMPLICATIONS AND FUTURE WORKS

6.2.1. THEORETICAL IMPLICATIONS

This document refers to two main theoretical implications. The first one, proposes a theoretical model that integrates technology adoption theory with the use of e-commerce systems in retail. The second, refers to the empirical evaluation of the research model in the context of actual use of retail platforms/applications. Adoption theory reports that the social influence variable has a positive impact on the intention to use, however, in this pandemic context, the variable not only does not have a positive impact, but it is still negative. Consumers use these retail platforms/applications for no social contact and other people's influence is not the most important because, due to pandemic limitations, it is the only way sometimes to make purchases.

This model provides explanation of the reality of on-line shopping of retail products in pandemics context. Scientific works that come after, namely, to understand consumer behavior in pandemic environment, can use the works of this study to understand and do future research.

6.2.2. PRACTICAL IMPLICATIONS

As practical implications of our study, it implies that the adoption of retail e-commerce platforms/applications by consumers, in times of pandemic, is associated with the risk perceived by them. Accordingly, this study can help retailers, and the industry in general, to understand which factors to take into account to increase purchase intention and to understand what risk affects consumer behavior, in order to make adoption more targeted to the final customer.

This study is not without limitations. First, the data were obtained from consumers from only one country, Portugal. Regarding gender, the fact that more than 67% of the respondents were women, may have some influence on the results obtained. Although the results are, in general, statistically significant, an investigation with a wider distribution, both of consumers and countries, will increase the model's explanatory power.

6.2.3. FUTURE WORKS

To future works it would be important to understand if cultural variables may have impact in the adoption of this platforms, if there are other behavioural variables, such as the perception of utility, government restrictions that may have an impact on this adoption.

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APPENDIX A. MEASUREMENT MODEL

Construct	Code	Indicator	Reference
Behavioural Intention	BI1.	I intend to continue using retail platforms/apps in the future.	
	BI2.	I will always try to use retail platforms/apps in my daily life.	
	BI3.	I plan to continue to use retail platforms/apps frequently.	
Behavioural Use	BU1.	I frequently use retail platforms/applications.	
		Please choose your usage frequency for each of the following:	
	BU2.	Search for prices	
	BU3.	Compare Prices	
	BU4.	Using discount coupons	
	BU5.	Search for promotions	
		Note: Frequency ranged from "never" to "always".	
Performance Expectancy	PE1.	I find retail platforms/apps useful in my daily life.	
	PE2.	Using retail platforms/apps increases my chances of achieving things that are important to me. (dropped)	
	PE3.	Using retail platforms/apps helps me accomplish things quicker.	
	PE4.	Using retail platforms/apps increases my productivity.	
Effort Expectancy	EE1.	Learning how to use retail platforms/apps is easy for me.	
	EE2.	My interaction with retail platforms/apps is clear and understandable.	
	EE3.	I find retail platforms/apps easy to use.	
	EE4.	It is easy for me to become skilful at using retail platforms/apps.	(Venkatesh et al., 2012)
Social Influence	SI1.	People who are important to me think that I should use retail platforms/apps.	
	SI2.	People who influence my behaviour think that I should use retail platforms/apps.	
	SI3.	People whose opinions that I value prefer that I use retail platforms/apps.	
Facilitating Conditions	FC1.	I have the resources necessary to use retail platforms/apps.	
	FC2.	I have the knowledge necessary to use retail platforms/apps.	
	FC3.	Retail platforms/apps is compatible with other technologies I use.	
	FC4.	I can get help from others when I have difficulties using retail platforms/apps.	
Hedonic Motivation	HM1.	Using retail platforms/apps is fun.	
	HM2.	Using retail platforms/apps is enjoyable.	
	HM3.	Using retail platforms/apps is very entertaining.	
Price Value	PV1.	Retail platforms/apps is reasonably priced.	
	PV2.	Retail platforms/apps is a good value for the money.	
	PV3.	At the current price, retail platforms/apps provide a good value.	
Habit	H1.	The use of retail platforms/apps has become a habit for me.	
	H2.	I am addicted to using retail platforms/apps.	
	H3.	I must use retail platforms/apps.	
	H4.	Using retail platforms/apps has become natural to me. (dropped)	

Self-Efficacy	SE1.	I am confident in my ability to protect myself from COVID-19 (SARS-CoV-2).	(Hassan et al., 2020)
	SE2.	I am certain that I will take the required actions even if they are difficult or inconvenient.	
	SE3.	I have the willpower to engage in precautionary actions.	
	SE4.	I am confident that I can carry out precautionary actions.	
	SE5.	I am certain that I can control myself to reduce the chances of contracting COVID-19 (SARS-CoV-2).	
Psychological Risk	PscR1.	When I come into close contact with others, I feel nervous.	(Chang, 2021)
	PscR2.	When I come into close contact with others, I feel uncomfortable.	
	PscR3.	It is easy for me to feel anxious when I am in close contact with others.	
	PscR4.	The distance of contact with people is a risk to me.	
Physical Risk	PhsR1.	In the workplace, I would worry about safe distance.	
	PhsR2.	I would worry about the possibility of infectious disease.	
	PhsR3.	If I have physical contact with other people, I worry about physical danger or injury.	
	PhsR4.	I will be worried that my behaviour or hygiene habits are not appropriate, and that I will be hurt.	
Economic Risk	EconR1.	Under the constant management of social distance, I worry that I have insufficient income.	
	EconR2.	Under the constant management of social distance, I'm worried that I might lose my job or stop working.	
	EconR3.	Under the constant management of social distance, I'm afraid I'll lose money or time.	

APPENDIX B. CROSS LOADINGS

	AGE	BI	BU	EE	EcoR	FC	GEN	H	HM	PE	PV	PhyR	PsyR	Risk	SE	SI
AGE	1	-0,246	-0,338	-0,376	-0,15	-0,293	-0,007	-0,249	-0,233	-0,265	-0,316	-0,145	-0,318	-0,251	0,016	-0,249
BI1	-0,246	0,972	0,622	0,725	0,433	0,646	-0,057	0,813	0,728	0,827	0,773	0,385	0,419	0,477	0,261	0,602
BI3	-0,233	0,972	0,645	0,693	0,49	0,59	-0,058	0,831	0,757	0,824	0,735	0,455	0,474	0,546	0,271	0,66
BU2	-0,307	0,557	0,902	0,534	0,323	0,401	0,051	0,616	0,535	0,524	0,522	0,373	0,4	0,429	0,212	0,43
BU3	-0,312	0,576	0,929	0,55	0,347	0,411	0,024	0,623	0,57	0,548	0,534	0,364	0,425	0,445	0,245	0,431
BU4	-0,25	0,584	0,847	0,46	0,415	0,333	0,05	0,67	0,598	0,602	0,538	0,343	0,498	0,492	0,175	0,54
BU5	-0,346	0,627	0,921	0,526	0,376	0,362	0,038	0,673	0,601	0,609	0,567	0,364	0,463	0,472	0,203	0,522
EE1	-0,348	0,625	0,508	0,937	0,351	0,757	-0,022	0,589	0,516	0,661	0,612	0,313	0,303	0,37	0,261	0,434
EE2	-0,362	0,727	0,571	0,963	0,427	0,766	-0,046	0,689	0,613	0,755	0,683	0,342	0,387	0,444	0,27	0,529
EE3	-0,343	0,735	0,573	0,957	0,442	0,759	-0,038	0,703	0,659	0,762	0,717	0,389	0,435	0,489	0,254	0,576
EE4	-0,38	0,683	0,53	0,952	0,422	0,781	-0,038	0,646	0,635	0,703	0,684	0,412	0,438	0,493	0,304	0,531
EcoR1	-0,171	0,454	0,388	0,404	0,947	0,238	-0,036	0,563	0,543	0,478	0,407	0,492	0,614	0,767	0,12	0,548
EcoR1	-0,171	0,454	0,388	0,404	0,947	0,238	-0,036	0,563	0,543	0,478	0,407	0,492	0,614	0,767	0,12	0,548
EcoR2	-0,1	0,455	0,382	0,405	0,951	0,274	-0,001	0,55	0,559	0,487	0,401	0,459	0,545	0,723	0,129	0,505
EcoR2	-0,1	0,455	0,382	0,405	0,951	0,274	-0,001	0,55	0,559	0,487	0,401	0,459	0,545	0,723	0,129	0,505
EcoR3	-0,155	0,451	0,392	0,429	0,962	0,299	-0,055	0,542	0,537	0,474	0,401	0,504	0,589	0,765	0,132	0,522
EcoR3	-0,155	0,451	0,392	0,429	0,962	0,299	-0,055	0,542	0,537	0,474	0,401	0,504	0,589	0,765	0,132	0,522
FC1	-0,195	0,555	0,345	0,728	0,233	0,914	-0,022	0,463	0,403	0,517	0,547	0,348	0,212	0,304	0,34	0,316
FC2	-0,315	0,568	0,354	0,755	0,271	0,952	-0,096	0,479	0,421	0,523	0,597	0,339	0,258	0,334	0,343	0,358
FC3	-0,295	0,606	0,373	0,759	0,259	0,954	-0,05	0,5	0,445	0,546	0,638	0,362	0,264	0,342	0,346	0,369
FC4	-0,27	0,61	0,463	0,721	0,279	0,868	0,031	0,558	0,527	0,584	0,626	0,349	0,319	0,369	0,376	0,484
GEN	-0,007	-0,059	0,045	-0,038	-0,033	-0,036	1	0,001	0,027	-0,002	-0,064	-0,001	-0,02	-0,019	-0,053	0,012
H1	-0,212	0,863	0,684	0,669	0,494	0,557	0,015	0,94	0,738	0,827	0,732	0,425	0,478	0,538	0,242	0,662
H2	-0,253	0,603	0,576	0,501	0,604	0,336	0,026	0,836	0,71	0,675	0,53	0,61	0,673	0,673	0,113	0,781
H3	-0,225	0,748	0,682	0,628	0,548	0,488	-0,004	0,94	0,752	0,779	0,738	0,504	0,588	0,636	0,261	0,683
H4	-0,234	0,848	0,68	0,712	0,51	0,573	-0,027	0,946	0,737	0,834	0,714	0,447	0,539	0,58	0,256	0,637
HM1	-0,165	0,708	0,579	0,587	0,58	0,443	0,02	0,74	0,957	0,67	0,696	0,474	0,55	0,616	0,314	0,691
HM2	-0,272	0,766	0,632	0,641	0,483	0,514	-0,021	0,766	0,951	0,749	0,793	0,469	0,545	0,583	0,297	0,656
HM3	-0,226	0,707	0,618	0,595	0,579	0,436	0,083	0,777	0,95	0,724	0,748	0,551	0,643	0,689	0,257	0,748
PE1	-0,193	0,795	0,561	0,719	0,442	0,575	0,025	0,781	0,681	0,928	0,729	0,371	0,423	0,476	0,244	0,634
PE2	-0,234	0,809	0,62	0,688	0,494	0,535	-0,004	0,831	0,721	0,954	0,758	0,455	0,505	0,562	0,264	0,727
PE3	-0,289	0,828	0,618	0,765	0,44	0,603	0,003	0,807	0,69	0,963	0,756	0,433	0,464	0,518	0,269	0,697
PE4	-0,285	0,772	0,597	0,691	0,525	0,509	-0,032	0,807	0,744	0,929	0,76	0,501	0,548	0,609	0,26	0,769
PV1	-0,282	0,731	0,602	0,667	0,403	0,63	-0,033	0,757	0,788	0,754	0,963	0,473	0,505	0,54	0,273	0,671
PV2	-0,319	0,769	0,575	0,707	0,394	0,64	-0,053	0,764	0,75	0,796	0,984	0,428	0,488	0,513	0,271	0,673
PV3	-0,319	0,763	0,577	0,696	0,436	0,64	-0,098	0,745	0,751	0,772	0,971	0,436	0,501	0,535	0,245	0,649
PhyR1	-0,125	0,395	0,345	0,392	0,337	0,445	0,026	0,416	0,405	0,398	0,393	0,842	0,539	0,677	0,474	0,377
PhyR1	-0,125	0,395	0,345	0,392	0,337	0,445	0,026	0,416	0,405	0,398	0,393	0,842	0,539	0,677	0,474	0,377
PhyR2	-0,083	0,362	0,353	0,348	0,367	0,38	-0,002	0,407	0,375	0,373	0,372	0,915	0,55	0,718	0,447	0,424
PhyR2	-0,083	0,362	0,353	0,348	0,367	0,38	-0,002	0,407	0,375	0,373	0,372	0,915	0,55	0,718	0,447	0,424
PhyR3	-0,12	0,358	0,361	0,318	0,456	0,306	0,032	0,446	0,483	0,401	0,39	0,924	0,642	0,791	0,355	0,483
PhyR3	-0,12	0,358	0,361	0,318	0,456	0,306	0,032	0,446	0,483	0,401	0,39	0,924	0,642	0,791	0,355	0,483
PhyR4	-0,17	0,389	0,335	0,284	0,589	0,208	-0,056	0,502	0,537	0,444	0,434	0,795	0,653	0,787	0,15	0,572
PhyR4	-0,17	0,389	0,335	0,284	0,589	0,208	-0,056	0,502	0,537	0,444	0,434	0,795	0,653	0,787	0,15	0,572
PsyR1	-0,349	0,469	0,496	0,423	0,582	0,308	-0,005	0,601	0,607	0,509	0,52	0,675	0,965	0,888	0,246	0,547
PsyR1	-0,349	0,469	0,496	0,423	0,582	0,308	-0,005	0,601	0,607	0,509	0,52	0,675	0,965	0,888	0,246	0,547
PsyR2	-0,325	0,446	0,516	0,412	0,604	0,304	-0,016	0,572	0,585	0,483	0,495	0,674	0,961	0,893	0,256	0,518
PsyR2	-0,325	0,446	0,516	0,412	0,604	0,304	-0,016	0,572	0,585	0,483	0,495	0,674	0,961	0,893	0,256	0,518
PsyR3	-0,3	0,469	0,478	0,378	0,567	0,234	0,006	0,594	0,587	0,535	0,5	0,656	0,957	0,873	0,234	0,59
PsyR3	-0,3	0,469	0,478	0,378	0,567	0,234	0,006	0,594	0,587	0,535	0,5	0,656	0,957	0,873	0,234	0,59
PsyR4	-0,218	0,345	0,375	0,34	0,552	0,232	-0,063	0,468	0,505	0,403	0,408	0,591	0,883	0,808	0,302	0,472
PsyR4	-0,218	0,345	0,375	0,34	0,552	0,232	-0,063	0,468	0,505	0,403	0,408	0,591	0,883	0,808	0,302	0,472
SE1	-0,056	0,309	0,293	0,263	0,182	0,34	-0,16	0,284	0,297	0,296	0,283	0,274	0,213	0,26	0,8	0,233
SE2	-0,005	0,247	0,193	0,268	0,137	0,32	-0,008	0,205	0,267	0,25	0,215	0,294	0,204	0,25	0,865	0,152
SE3	0,111	0,196	0,154	0,223	0,077	0,337	0,02	0,189	0,238	0,203	0,219	0,395	0,244	0,288	0,891	0,12
SE4	0,043	0,199	0,176	0,224	0,028	0,31	-0,042	0,169	0,222	0,17	0,215	0,395	0,26	0,28	0,864	0,137
SE5	-0,005	0,176	0,125	0,215	0,118	0,292	0,002	0,158	0,242	0,219	0,189	0,362	0,241	0,287	0,8	0,142
SI1	-0,248	0,641	0,51	0,54	0,554	0,419	0,005	0,725	0,708	0,735	0,665	0,548	0,56	0,641	0,192	0,986
SI2	-0,255	0,634	0,527	0,53	0,546	0,398	0,016	0,733	0,725	0,735	0,669	0,516	0,558	0,625	0,179	0,991
SI3	-0,236	0,65	0,55	0,551	0,534	0,417	0,016	0,743	0,737	0,749	0,691	0,535	0,558	0,629	0,196	0,989