

*Research Paper***Research consensus about Portuguese consumer's purchase intention through v-commerce: Delphi method***Submitted in 28, April 2023**Accepted in 27, June 2023**Evaluated by a double-blind review system***SARA TEIXEIRA** <sup>1\*</sup>**ABSTRACT**

**Purpose:** Despite e-commerce being at its peak motivated by digital transformation and for pandemic reasons that provided its evolution, v-commerce is still in its early days. Therefore, the aim of this study is to identify the determining factors of Portuguese consumer's purchase intention through v-commerce to be an added value for this type of commerce to expand.

**Design/methodology/approach:** A literature review was carried out where the main factors that influence the adoption/acceptance of v-commerce were identified. To analyse the most important factors, Delphi method was used, with the collaboration of experts being requested so that they could express their opinion on the subject through two rounds of questionnaires.

**Findings:** The results show that the factors that most influence the consumer's purchase intention are perceived usefulness; perceived ease of use; perceived convenience; satisfaction and security. Also, it was found that v-commerce has an influence on the Portuguese consumer's purchase intention and that a positive attitude towards v-commerce will influence the Portuguese consumer's purchase intention.

**Practical implications:** There is no study that addresses the issue in the context of the Portuguese consumer. Therefore, this research is relevant for the knowledge of the Portuguese market and for all those interested in the subject, (e.g., business community, researchers, e-commerce professionals).

**Originality/value:** The investigation aims to know what the determining factors of purchase intention through v-commerce to develop an explanatory model of the Portuguese consumer's purchase intention through v-commerce.

**Keywords:** V-commerce, consumer, purchase intention, acceptance of technology, virtual commerce, e-commerce.

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## 1. Introduction

A new type of e-commerce is on the rise – v-commerce or virtual commerce. Although online shopping is currently the daily life of many individuals, very motivated by the development of mobile technologies, the use of mobile devices (like smartphones and tablets), and the emergence of the COVID-19 pandemic fuelled an exponential increase in this form of commerce. However, commerce using Virtual Reality (VR) and Augmented Reality (AR) technology is still in its early days (Luna-Nevarez & McGovern, 2021).

The growth of VR and AR technologies has led to the development of virtual purchasing environments that can realistically simulate physical environments. So, v-commerce aims at a new type of shopping experience, close to the real world and higher than that offered in existing online stores that uses virtual environments (Luna-Nevarez & McGovern, 2021).

Based on the existing literature on v-commerce, it was found that the studies conducted on adoption/acceptance use the TAM (Technology Acceptance Model) and its derivations, e.g., UTAUT (Unified Theory of Acceptance and Use of Technology) and UTAUT 2 (Alkarney & Almakki, 2022; Byram, 2021; Elboudali et al., 2020; Figliozzi, 2018; Gebremichael & Khan, 2020; Lee & Kim, 2022; Luna-Nevarez & McGovern, 2021; Martínez-Navarro et al., 2019; Oh, 2021; Sagnier et al., 2020; White Baker et al., 2019; Xue et al., 2020a, 2020b) .

From this study, it is intended to verify which are the determining factors of Portuguese consumer's purchase intention through v-commerce, using the variables considered as relevant in the literature and that are addressed in the technology acceptance models mentioned above so that in the conclusion of the study, an explanatory model of factors of Portuguese consumer's purchase intention through v-commerce is developed.

To study the theme, synthesize the number of variables obtained in the literature and achieve the desired model, Delphi method was used, where, through two rounds of questionnaires, the consensus of the expert panel was obtained in relation to the questioned.

Although there has been talk of v-commerce for a while, it is only recently due to digital transformation and pandemic circumstances that the online and virtual world has gained strength. Thus, studying acceptance and purchase intention through v-commerce is a subject that has not yet been studied and there are no studies that support the analysis of the Portuguese consumer, thus, there is a lack of research in this area. For this reason, this research contributes to the understanding of v-commerce in the Portuguese market, as well as makes it possible to understand the behaviour of the Portuguese consumer, being an advantage for the community at large, researchers, organizations, and professionals in the field of e-commerce and information and communication technologies.

This article will be divided into six sections, starting with an introduction section where a brief approach to the main theme of research is made. The second section consists of a literature review where v-commerce is addressed. The next section addresses the adoption of technology and determinant factors of v-commerce from other studies obtained from the literature review. The fourth section discusses the methodology, the method used for this study (Delphi method) and how it was applied. In the fifth section, the analysis and discussion of the obtained results is performed. The work concludes with a sixth section containing some conclusions about the research developed.

## 2. Literature Review

### 2.1. V-Commerce

#### 2.1.1. Concept

The evolution of e-commerce has quickly become a way of life and most people today make use of it. V-commerce, a type of e-commerce, is an emerging phenomenon that is gaining strength in the field of marketing, business, and retail (de Regt & Barnes, 2019; Velev & Zlateva, 2019).

The use of virtual worlds is a growing trend, i.e., technology-created virtual environments that try to replicate parts of the real world and people are increasingly likely to use them (Smith, 2020; Xue et al., 2020a). Using this type of worlds arises the v-commerce, three-dimensional virtual environment (3D) where integrates the forms of commerce (e.g., purchase and sale of products).

V-commerce or virtual commerce is the name that can be given to commerce that is carried out using virtuality. Table 1 shows the concepts of v-commerce according to several authors.

**Table 1: V-commerce concepts**

Definitions	Authors
“... electronically mediated commercial transactions that originate from an alternate reality technological platform and involve either digitally-generated or real-world products and services.”	(de Regt & Barnes, 2019, p. 2)
“... is composed of the e-commerce block and uplifts it by incorporating a virtual environment and immersive interactions.”	(Elboudali et al., 2020, p. 554)
“...a subset of the e-commerce business model, primarily focused on the adoption of VR technology to enhance the online experience through the creation of VR marketplaces.”	(Luna-Nevarez & McGovern, 2021, p. 171)
“...immersive technology such as augmented reality and virtual reality into e-commerce to shift consumer perception from 2D product catalogs to 3D immersive virtual spaces.”	(Shen et al., 2021, p. 1)

Source: Own development

Therefore, v-commerce consists of the use of virtual environments with VR and AR technology to carry out a commercial activity (e.g., sales products).

### 2.1.2. Benefits of V-Commerce

The use of VR and AR technologies in v-commerce offer some benefits, namely (Velev & Zlateva, 2019):

- **Location:** virtual stores do not need real construction, energy costs and associated rental.
- **Employee:** no real permanent employee is required.
- **Customer growth:** people who normally don't have time to go to the store and try out the products can now do so.
- **Creates an engaging personal experience for customers:** the integration of VR and AR technology brings a unique feel during the purchasing process.
- **Greater experimentation:** through VR and AR customers can try the products, increasing the possibility of real purchase.
- **Returns:** with the possibility of trying the products, you can minimize returns.
- **Unexpected occasions:** even in unexpected cases e.g., natural disasters, v-commerce can continue to work.

### 2.1.3. Types of v-commerce

There are several forms of v-commerce that can be differentiated by their level of immersion, i.e., non-immersive or immersive systems (Jain & Werth, 2019; Pleyers & Poncin, 2020):

- **Non-immersive:** virtual content displayed through a computer monitor without the need for additional equipment and users interact using traditional interfaces (e.g., mouse, keyboard).
- **Immersive:** realistic environment common high sense of presence. The content is accessed e.g., through a head-mounted and controlled display e.g., data gloves, controllers, or body movements. Allows to track users' movements and show changes accordingly.

## 2.2. Technology Acceptance Models

### 2.2.1. TAM and UTAUT

The adoption of v-commerce, its acceptance by consumers is not yet a very explored topic, much less regarding the Portuguese market. In the investigations conducted on the adoption and intention, the models related to the acceptance of technology by the consumer used are the TAM (Technology Acceptance Model) and its extensions e.g., UTAUT (Unified Theory of Acceptance and Use of Technology) and UTAUT2.

Technology Acceptance Model (TAM) emerged from an adaptation of the Theory of Rational Action (TRA) and aims to understand the acceptance of users of information systems or technologies. This model seeks to explain the behavioural intentions of adopting technology-based innovations. The use of this model has been widespread for all recent technologies (Davis, 1989; Davis et al., 1989; Luna-Nevarez & McGovern, 2021).

TAM to explain computer acceptance behaviour uses two key variables: perceived ease of use (user's expectation that the target system is effort-free) and perceived usefulness (individual's possibility to use a specific application system that will increase

performance at work) (Davis et al., 1989). In this model it is mentioned that the use of the computer/system is determined by behavioural intention and that it is motivated by the attitude towards the use of the system and by the perceived utility. Perceived usefulness has a direct influence on the intention to use and indirectly through the attitude in the behavioural intention to use. Attitude is co-determined by perceived usefulness and perceived ease of use. Perceived usefulness can be determined by external beliefs directly or through perceived ease of use (Davis et al., 1989).

UTAUT indicates that there are four direct factors of user acceptance and usage behaviour: performance expectation (individual believing that the use of the system will generate benefits in the performance of work), effort expectation (ease in using the system by part of the individual), social influence (individual understands that it is important for others to believe that he or she should use the new system), facilitating conditions (individual believes that an organization and technical infrastructure exist to support use of the system). The UTAUT also includes key moderators of it intention and use – sex, age, willingness to use and experience (Venkatesh et al., 2003).

UTAUT 2 was developed by Venkatesh et al. (2012) extending UTAUT to study acceptance and use of technology in a context of consumption. This model includes, in addition to the original UTAUT variables, hedonic motivation (fun or pleasure derived from using a technology), price value (benefits from using a technology are perceived as greater than the monetary cost) and habit (opportunity to use a target technology and is typically operationalized as the passage of time since an individual's initial use of a technology) (Brown & Venkatesh, 2005; Venkatesh et al., 2012).

According to Luna-Nevarez and McGovern (2021), v-commerce is a new technology and a new shopping method, so it will be appropriate to use TAM to understand consumer acceptance. This investigation, therefore, will be supported by the TAM to understand the Portuguese consumer.

### 2.2.2. Determining factors

According to the analysis of several studies on acceptance and intention there are some factors mentioned as determinants in the adoption/acceptance.

#### 2.2.2.1. Perceived usefulness

The use of technology (e.g., v-commerce) to improve consumers' shopping experience (Luna-Nevarez and McGovern, 2021). Alkarney and Almakki (2022) in their study identified that perceived usefulness has a positive and direct influence on the intention to use virtual stores. Byram (2021) shows that perceived usefulness has a positive effect on attitude toward the 3D virtual reality shopping. Increasing levels of perceived usefulness will have a positive impact on attitudes toward online shopping in a virtual world's environment according to White Baker et al. (2019).

#### 2.2.2.2. Perceived Ease of Use

When consumers perceive new technology (e.g., v-commerce) as effortless (Luna-Nevarez and McGovern, 2021). Perceived ease of use in the study by Alkarney and Almakki (2022) done in Saudi Arabia is seen to have a direct positive relationship with the intention to use virtual stores. Perceived ease of use has a positive effect on attitude towards the 3D virtual reality shopping (Byram, 2021). (White Baker et al., 2019) in their

study show that increasing levels of perceived ease of use will have a positive impact on attitudes toward online shopping in a virtual world's environment.

#### 2.2.2.3. Social Influence

Individual realize it is important that others believe that he should use the new system (e.g., v-commerce) (Venkatesh et al., 2003). Lee and Kim (2022) in their research on Metaverse indicate that social influence can increase Metaverse user satisfaction and various behavioural intentions (usage intention, purchase intention, and word of mouth intention). Gebremichael and Khan (2020) in their research indicate that social influence positively influences the behavioural intention of the shopper to buy through VR, reducing the risk of transition, i.e., social influence has a positive and direct influence on the consumer's intention to make a purchase using VR.

#### 2.2.2.4. Need for Touch

Refers to the individual's preference to extract and use information obtained through touch or the haptic system (Peck & Childers, 2003). According to Delgado (2019) in their investigation on the influence of digital merchandising in a scenario of virtual selling the decrease in physical inspection of the product increases the purchase intention.

#### 2.2.2.5. Security

Deals with the inadvertent compromise of third-party customer data (Byram, 2021). According to the same author in his study, perceived security has a positive effect on the attitude towards the virtual reality store platform (Byram, 2021). The greater the perceived security by the consumer when shopping in an online store, the more positive is their attitude towards shopping in an online store (Barkhi et al., 2008). Alkarney and Almakki (2022) found in their study a direct positive relationship between security risk and intention to use virtual stores.

#### 2.2.2.6. Privacy

It is a conscious effort to handle customer data and information (Byram, 2021). Alkarney and Almakki (2022) found in their study a direct positive relationship between privacy risk and intention to use virtual stores.

#### 2.2.2.7. Perceived Control

It is the individual's perception of the ease/difficulty in manifesting a behaviour considering past experiences, as well as the anticipation of obstacles in carrying it out (Ajzen, 1991). Alkarney and Almakki (2022) found in their study a direct positive relationship between perceived control and intention to use virtual stores.

#### 2.2.2.8. Telepresence

Consists of the rewarding feeling of being present in an environment that seems natural (Cowan & Ketrone, 2019). Alkarney and Almakki (2022) report that telepresence has a direct positive relationship with the intention to use virtual stores.

#### 2.2.2.9. Perceived Convenience

It is defined as ease of shopping, includes conveniences offered by shopping from virtual stores platforms (Yaraş et al., 2017). Xue et al. (2020b) shows in the study that 67% of participants perceived convenience in v-Commerce as a priority for them. Perceived convenience of using a technology to purchase has a positive effect on consumer attitudes in the study of the author (Figliozzi, 2018).

#### 2.2.2.10. Satisfaction

It is consumers' evaluation of a virtual shopping environment in terms of satisfying their needs (Shen et al., 2021). Satisfaction in a study by Alkarney and Almakki (2022) is considered one of the factors that positively and directly influences the intention to use virtual stores by consumers in Saudi Arabia.

#### 2.2.2.11. Hedonic Motivation

It is defined as the fun or pleasure derived from using a technology, such as v-commerce (Brown and Venkatesh, 2005). Hedonic motivation has a direct positive relationship with the consumer's intention to use virtual stores (Alkarney and Almakki, 2022).

### **3. Methodology**

Regarding the research methodology, it was considered a qualitative methodology that includes a quantitative part regarding the way of obtaining the data. Therefore, the Delphi method was selected. This is considered at its base a qualitative method that can be supported by a quantitative component regarding the technique to obtain the data from the experts (Avella, 2016; Reguant-Álvarez & Torrado-Fonseca, 2016). In this study, the questionnaire was used to ask the specialists for their response for further statistical analysis.

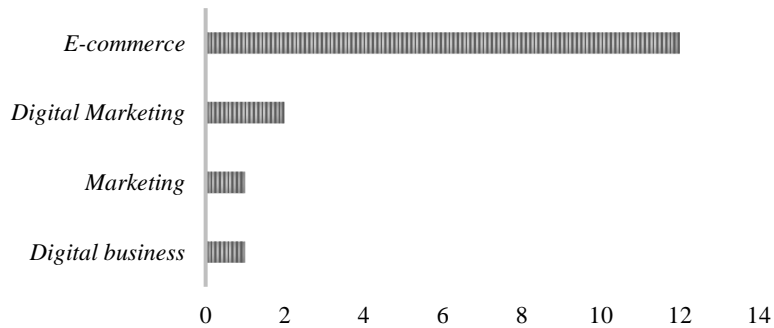
A literature review does not always respond to a specific problem. Therefore, the use of Delphi method in this research aims to collect from experts in the field of e-commerce their opinion about Portuguese consumer's purchase intention through v-commerce.

Norman Dalkey and Olaf Helmer created Delphi method when they conceived it for the Rand Corporation. This is a technique that makes it possible to obtain and combine opinions on a problem from a panel of experts to generate consensus. Throughout the Delphi method, several rounds of questionnaires are launched asking for the experts' opinion and at the end of each round the results obtained are analysed. If there is no consensus, a new round is started until consensus is reached (Almenara & Moro, 2014; Oliveira et al., 2019; Reguant-Álvarez & Torrado-Fonseca, 2016).

#### 3.1. Characterization of the expert group

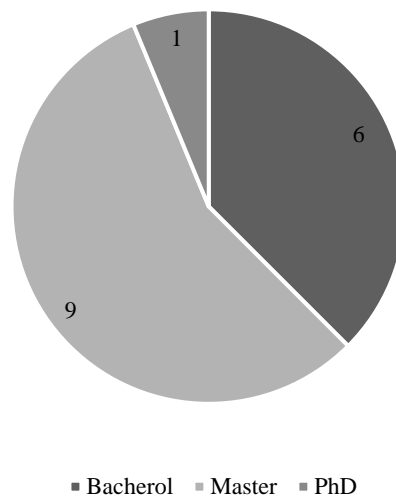
Specialists are chosen based on people who have an academic career, special merit, notable professional experience in relation to the subject under study. Consideration should be given to criteria (Figure 1 and 2) e.g., profession, position, years of experience, teaching category, academic degree, location (Reguant-Álvarez & Torrado-Fonseca, 2016; Valdés & Marín, 2013).

**Figure 1: Specialization area of the specialist’s panel**



Source: Own development

**Figure 2: Academic qualifications of the specialist’s panel**



Source: Own development

After defining the profile of the experts, it was necessary to define the elements that would constitute the panel. There is no consensus as to the ideal number of specialists for the application of the Delphi method. For Thangaratinam and Redman (2005) there is no specific rule for the size of the panel, the acceptability of the research is evaluated by the qualities of the expert panel rather than its numbers.

When a study has 13 or more panel members, its confidence is 0.8 or greater, a value not significantly extrapolated in studies of 30 or more experts (N. C. Dalkey, 1969; N. Dalkey & Helmer, 1963). As in round 1, 16 responses were obtained and in round 2, 13, the confidence level in this study is equal to or greater than 0.8.



Based on this definition of sample size, based on the area of activity and academic degree, it was defined that the questionnaire would be sent to e-commerce specialists who are working in Portugal and who are related to the v-commerce/e-commerce by both academic and professional circles.

### **3.2. Design and implementation**

In the present study, two rounds of questionnaires to specialists were conducted. In the first round and based on the literature review, the variables considered as determinants of the purchase intention through v-commerce were collected. Afterwards, specialists were asked to classify the items according to the importance they think they have for Portuguese consumers, always allowing specialists to add any missing variable or give suggestions/criticisms.

In all rounds, questions were asked to the specialists of a closed nature, aimed at determining the importance of the items for the panel. The importance rating was performed using a 5-point Likert scale, where level 1 is “Strongly Disagree” and level 5 “Totally Agree”, in order to gather the opinions of experts (Habibi et al., 2014).

The first question was to understand the degree of agreement of experts on whether v-commerce has an influence on the purchase intention of the Portuguese consumer and the second to understand the degree of agreement if a positive attitude towards v-commerce will influence the Portuguese consumer. intend to buy through v-commerce. Parametric and quartile analysis were used to analyse these questions (Reguant-Álvarez and Torrado-Fonseca, 2016).

In the third question, which aimed to understand the determining factors of purchase intention through v-commerce, after collecting the opinion of the experts, the average score of their opinions was calculated and the ordering criterion was carried out based on the average classification of each variable. As there was no consensus on this question, a second round was carried out, placing the variables ordered according to the average of responses from the first round in the question where consensus was not reached (Habibi et al., 2014).

In the second round, only the question that intended to identify the determinants of the Portuguese consumer's v-commerce intention was posed, as this was the question that would need consensus. In this question, the same 5-point Likert scale was used as in the previous round and the variables suggested by the experts in the first round were considered. In this last round and after analysis, it was found that consensus was reached and, considering the average of responses from the round, the most relevant determinants of adoption were selected. According to Habibi et al. (2014) for scales of seven and five points, criteria with means lower than five and four are respectively removed and this procedure was used to define the main determinants.

A web-based questionnaire management platform was used to disseminate the questionnaire and its link was shared via LinkedIn to ensure anonymity and the experts' choice to respond.

### **3.3. Consensus criterion**

The definition of a consensus criterion is fundamental. Normally, to reach consensus, levels between 70% and 80% are defined, however some authors do. Based on the

literature in this investigation, the level of 80% is accepted (Green et al., 1999; Grisham, 2009).

## 4. Results

Reguant-Álvarez and Torrado-Fonseca (2016) report that in the Delphi method the main statistics used are mean, median, mode, standard deviation, maximum, minimum and quartiles. Santos and Amaral (2019) states that for analysis in the Delphi method, a non-parametric correlation can also be used, e.g., the Spearman correlation coefficient and Kendall concordance coefficient, as it provides an accurate measure of the relationship between the ratings of expert assessments or responses from two consecutive rounds. Data were analysed using the SPSS statistical tool (Statistical Package for the Social Sciences).

The results achieved will then be presented, and a dataset detailed description of each individual round will be made.

### 4.1. Round 1

**Table 2: Frequency of question 1 - Do you consider that v-commerce has an influence on the consumer's purchase Portuguese?**

	Frequency	Percentage	Accumulated percentage
<i>Strongly Disagree</i>	2	12,5%	12,5%
<i>Neither agree nor disagree</i>	5	31,25%	43,75%
<i>Agree</i>	4	25%	68,75%
<i>Totally agree</i>	5	31,25%	100%
<b>Total</b>	16	100%	

Source: Adapted from SPSS

**Table 3: Parametric and quartiles analysis of question 1**

Quartiles	Question 1			
	Q1/4 0-1,25	Q2/4 1,25-2,5	Q3/4 2,5-3,75	Q4/4 3,75-5
<i>Number of answers</i>	2	0	5	9
<i>Percentage</i>	12,5%	0%	31,25%	56,25%
<i>Average</i>	3,625			
<i>Median</i>	4			
<i>Standard deviation</i>	1,310216267			

Source: Adapted from SPSS

The results obtained in question 1 show consensus, because most individuals answered, "Agree" and "Totally Agree" (81.3%) (Table 2). Observing the quartiles analysis, 3rd quartile obtained 5 responses (31.25%) and the remaining responses were in the 4th quartile (9 responses) and only 2 in the 1st quartile (Table 3). The average was 3,625 and median 4, which leads to the conclusion that experts agree that v-commerce has an influence on the Portuguese consumer' purchase intention. Therefore, this issue does not need to be examined in a second round.

**Table 4: Frequency of question 2 - Indicate your degree of agreement in relation to the following statement: "A positive attitude towards v-commerce will influence the portuguese consumer to intend to buy through v-commerce."**

	Frequency	Percentage	Accumulated percentage
<i>Disagree</i>	1	6,25%	6,25%
<i>Neither agree nor disagree</i>	2	12,5%	18,75%
<i>Agree</i>	8	50%	68,75%
<i>Totally agree</i>	5	31,25%	100%
<b>Total</b>	16	100%	

Source: Adapted from SPSS

**Table 5: Parametric and quartiles analysis of question 2**

Quartiles	Question 2			
	Q1/4 0-1,25	Q2/4 1,25-2,5	Q3/4 2,5-3,75	Q4/4 3,75-5
<i>Number of answers</i>	0	1	2	13
<i>Percentage</i>	0%	6,25%	12,5%	81,25%
<i>Average</i>	4,0625			
<i>Median</i>	4			
<i>Standard deviation</i>	0,853912564			

Source: Adapted from SPSS

In question 2, most of experts "Totally agree" (81.25%) that a positive attitude towards v-commerce will influence the Portuguese consumer to have the intention to buy through v-commerce (Table 4). Thus, in the analysis of quartiles, 4th quartile obtained 13 responses (81.25%) and the remaining responses were in the 2nd quartile (1 responses) and only the 3rd quartile (2 responses) (Table 5). The mean was 4.0625 and the median was 4. This question also does not need to be analysed in a second round.

The last question of the round aimed to know which factors would determine purchase intention through v-commerce.

**Table 6: Sorting of variable positions after round 1**

Initial Position	Variable	Round 1 Position	Average
1	Perceived Usefulness	1	4,5
2	Perceived Ease of Use	2	4,5
3	Social Influence	7	3,8
4	Need for Touch	11	2,9
5	Security	4	4,1
6	Privacy	8	3,8
7	Perceived Control	6	3,9
8	Telepresence	10	3,3
9	Perceived Convenience	5	4,1
10	Satisfaction	3	4,3
11	Hedonic Motivation	9	3,8

Source: Own development

After launching the first round of questionnaires to experts, the variables analysed in this study were ordered according to the relative consensual average importance obtained by the experts' opinions.

In Table 6 you can see that the order at the end of the first round is quite different from the one used to start the process. At the same time, some relevant statistical data can be verified, such as the average value of relative importance presented individually for each variable, and the higher this value, the greater the impact of the variable on ongoing research.

Analysing the data from the previous table it is not possible with these data to perceive the consensus degree between the initial position and round 1, because it was found that few variables whose average classification is above 4 and none to 5 as suggested by Habibi et al. (2014).

Although the analysis of the statistical values presented in Table 7 is important to arrive at the perception of the direction of the answers for each of the variables in question, it is not possible with these data to clearly perceive the degree of consensus. For this, we used Kendall's correlation coefficient and Spearman's correlation coefficient, with the SPSS tool. The results can be seen in Table 7.

**Table 7: Kendall and Spearman coefficient - round 1**

			Initial Position	Round 1
Kendall's tau_b	Initial Position	Correlation Coefficient Sig. (2-tailed)	1,000	,236
			.	,312

		N	11	11
	Round 1	Correlation Coefficient	,236	1,000
		Sig. (2-tailed)	,312	.
		N	11	11
Spearman's rho	Initial	Correlation Coefficient	1,000	,345
	Position	Sig. (2-tailed)	.	,298
		N	11	11
	Round 1	Correlation Coefficient	,345	1,000
		Sig. (2-tailed)	,298	.
		N	11	11

Source: Adapted from SPSS

Assuming the differences in the calculation of the two statistical methods mentioned, both the result of Spearman's correlation coefficient (0.345) and Kendall's coefficient of agreement (0.236) returned low correlation values, which indicates a very low index between the initial ordering variables. and the resulting sort of the first round. From the interpretation of these values, it is possible to deduce that the minimum reference (>80%) was not reached as a goal of level of consensus among experts. Based on this indicator, it was necessary to move on to a round of questionnaires with the aim of reaching a more significant level of consensus.

**4.2. Round 2**

Following the process conducted in the previous round, for this round, the average scores of the relative importance for the variables under study were calculated again, making it possible to arrive at a new order, which can be seen in Table 8. That is, in round 2, considering the suggestions of variables referenced by the specialists in round 1. In this round, the average of responses in each of the variables was calculated and they were reordered according to their average.

**Table 8: Sorting of variable positions after round 2**

Round 1 Position	Variable	Round 2 Position	Average
1	Perceived Usefulness	1	4,692307692
2	Perceived Ease of Use	2	4,692307692
3	Perceived Convenience	5	4,538461538
4	Satisfaction	3	4,384615385
5	Security	4	4,384615385
6	Privacy	8	3,846153846
7	Perceived Control	6	3,692307692
8	Hedonic Motivation	9	3,615384615
9	Social Influence	7	3,538461538
10	Telepresence	10	3,153846154

11	Need for Touch	11	2,923076923
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Source: Own development

In the table VIII, it is also possible to verify the average obtained through the results as in the previous round, if the higher the average relative importance of that presented by a variable, the greater its impact on the research in question.

As in the previous round, after a more direct observation of the responses obtained in the current round, the research team performed a more robust statistical analysis with the aim of reaching a degree of consensus in the responses between rounds.

Analysing the data from the previous table it is not possible with these data to perceive the degree of consensus between round 1 and 2, because it was found that few variables whose average classification is above 4 and none to 5 as suggested by Habibi et al. (2014). Therefore, Kendall's correlation coefficient and Spearman's correlation coefficient was used through the SPSS to conclude whether there was consensus among the experts (Table 9).

**Table 9: Kendall and Spearman coefficient - round 2**

			Round 1	Round 2
Kendall's tau_b	Round 1	Correlation Coefficient	1,000	,818(**)
		Sig. (2-tailed)	.	,000
		N	11	11
	Round 2	Correlation Coefficient	,818(**)	1,000
		Sig. (2-tailed)	,000	.
		N	11	11
Spearman's rho	Round 1	Correlation Coefficient	1,000	,927(**)
		Sig. (2-tailed)	.	,000
		N	11	11
	Round 2	Correlation Coefficient	,927(**)	1,000
		Sig. (2-tailed)	,000	.
		N	11	11

\*\* Correlation is significant at the 0.01 level (2-tailed).

Source: Adapted from SPSS

The analysis methodology was again based on the use of Kendall's correlation coefficient and Spearman's correlation coefficient. The results of this statistical analysis can be seen in detail in Table 9.

As can be seen in Table 9, Kendall's correlation coefficient has a value of about 0.818. Regarding the Spearman correlation coefficient, it is evident that the correlation is greater than 0.8 (0.927). Thus, the analysis makes it possible to verify the existence of consensus between the answers of the experts, which according to the definition of the Delphi method itself, is a sufficient criterion for the end of the study, being possible at this

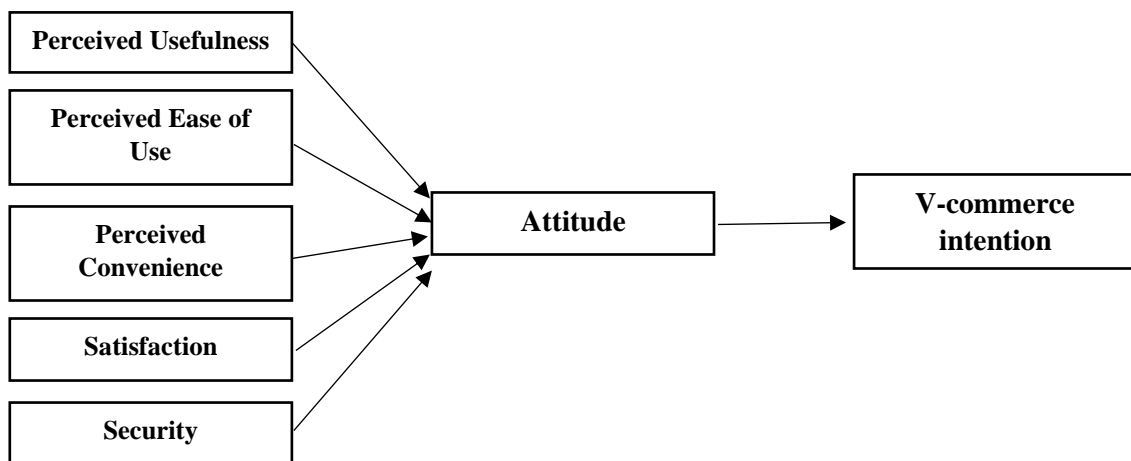
moment to infer considerations about the results obtained in the next chapter of this article.

Analysing table IV, it is verified that it is not possible with these data to perceive the consensus degree between round 1 and 2, it was found that few were the variables whose average rating is above 4 and none at 5 (Habibi et al., 2014).

Exhaustively analysing the results obtained in round 2 and considering the variables in which the average level on the scale was equal to or greater than 4, seen as truly relevant to the intention and removing the variables that have averages lower than four, it is concluded that there are five variables considered to have the greatest impact on the Portuguese consumer' purchase intention through v-commerce - Perceived Usefulness; Perceived Ease of Use; Perceived Convenience; Satisfaction and Security.

Therefore, the following conceptual model and the following research hypotheses are proposed (Figure 1).

**Figure 1: Explanatory model of Portuguese consumer' purchase intention through v-commerce**



Source: Own development

**H1: A favorable attitude/acceptance towards v-commerce and, consequently, lead to purchase intention is influenced:**

- a. *Perceived usefulness*
- b. *Perceived ease of use*
- c. *Perceived convenience*
- d. *Satisfaction*

**H2: An unfavorable attitude/acceptance towards v-commerce and, consequently, lead to purchase intention is influenced:**

- a. *Security*

**H3: A positive attitude towards v-commerce will influence the consumer to intend to buy through v-commerce.**

## **5. Discussion and Conclusion**

V-commerce is booming, so the result of this study can influence its expansion and will enhance many business areas. From this work, all stakeholders will know which factors can influence the purchase intention through v-commerce according to the experts' point of view.

This research serves to improve awareness of the determinants that influence intention and help advance knowledge about v-commerce in the Portuguese market.

A literature review was conducted on v-commerce where several factors considered as determinants of the intention to purchase through v-commerce - perceived usefulness, perceived ease of use, social influence, need for touch, security, privacy, perceived control, telepresence, perceived convenience, satisfaction, and hedonic motivation were gathered. However, due to the recent issue it is difficult to collect from a review all the determinants and considering their degree of importance for intent. Thus, the need arose to identify which are truly relevant factors and to understand with specialists in the area what are the determinants of the purchase intention through v-commerce using the Delphi method. Thus, this method was implemented with the purpose of obtaining a consensual opinion through feedback from experts in the area through two rounds of questionnaires. At the end of the two rounds of the questionnaire, there was no disagreement between them, so conclusions could be drawn.

Experts agree that v-commerce influences the purchase intention of Portuguese consumers and that a positive attitude towards v-commerce will influence Portuguese consumers to have the intention to buy through v-commerce. This conclusion is in agreement with studies by some authors (Chesney et al., 2017; Figliozzi, 2018; Han, 2019; Luna-Nevarez & McGovern, 2021; Martínez-Navarro et al., 2019).

The factors that were verified in this study with the most favourable impact on the purchase intention via v-commerce by Portuguese consumers were Perceived Ease of Use, Perceived Usefulness and Perceived Convenience. The factor considered to have an unfavourable impact on purchase intention via v-commerce was Security. These determinants are in addition to several studies carried out (Alkarney & Almakki, 2022; Barkhi et al., 2008; Byram, 2021; Figliozzi, 2018; White Baker et al., 2019; Xue et al., 2020b).

Despite considering that this investigation had positive results, some difficulties and limitations were identified, such as the lack of studies on the subject in the Portuguese context, the results were obtained based on a sample of specialists in the area, and only the main variables that influence the intention referred to in the studies. Therefore, an investigation within other theoretical perspectives and under other parameters would help to enrich the knowledge of v-commerce intent.

The difficulties and limitations of a study should be seen as suggestions. Therefore, it is concluded that everything that has already been investigated can be investigated again in future studies. As the topic of commerce and commerce related to the virtual is always in constant update and progression, so new studies may be developed considering new variables that affect the intention that they have not been contemplated in this



investigation. Also, in the future, the model and the hypotheses resulting from this study can be used to carry out an investigation with the consumer and better understand their point of view.

This research will allow a boost in the progress of knowledge of v-commerce, of the Portuguese consumer, providing the scientific, academic, business community and all interested parties with up-to-date information on the subject. The findings of this study will allow experts and organizations to have a view of the Portuguese consumer's purchase intention not yet realized, allowing to assist in decision making and in the choice of accurate ways to reach the consumer.

In summary, this research will identify the factors that influence and inhibit the Portuguese consumer to have a purchase intention when in contact with v-commerce and then, predict ways to reach the consumer so that organizations do not waste resources and are more effective in the choices they make to reach the consumer.

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