COMMUNICATION & SOCIETY

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E-Commerce, social media and Social Inclusion: A Typology of Users Over 60 Years of Age in Spain

Abstract

The growth of e-commerce and the ageing of the world population converges in a situation which represents significant challenges for the economy: a large population of over 65year-olds with major limitations for online shopping. The digital division, although reduced in certain sectors, in others, such as e-commerce persists. This research involves the study of 405 subjects, Spanish seniors aged between 60 and 79, to discover and analyse the barriers, motivators and behaviour with regards to shopping online. Using a telephone survey and a random sample, a typology of users was established as per their behaviour and perception of e-commerce. The main finding is the segmentation in eleven typologies of users, identified through cluster analysis. The major conclusions confirm the barriers related to data security or levels of confidence. Furthermore, with basic digital skills, seniors consider themselves capable of completing purchases on the Internet. Online shoppers feel empowered being digitally self-sufficient, while non-shoppers desiring to be independent, require the implementation of measures to aid the process on commercial websites.

Keywords
E-commerce, Spain, seniors, behaviour, use, shopping.

1. Introduction

Twenty years ago, the New York Times published in the economy section an article which presented the dichotomy between the desire of seniors to use e-commerce and the physical and psychological barriers which they encounter (Cutter, 2000, p. 37). Twenty years on, not only does this situation persist, but the pandemic of COVID-19 "will change retail forever, and the initial impact on e-commerce is creating challenges for online sales and services" (KPMG, 2020).

Two major realities have deeply transformed society since the beginning of the 21st century: the ageing population and the development of technology. Information and Communications Technology (ICT) has transformed the way in which we work, perform procedures, processes and transactions, connect with each other and consume. Román and Pavón (2016) speak of a new reality in which society has evolved from being one of information to one of knowledge, in which realities emerge such as telemedicine, teleworking, digital platforms, videoconferences or e-commerce (Alrumiah & Hadwan, 2021). In this scenario,

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seniors are one of the most vulnerable segments of society (Abad-Alcalá, 2014; Llorente-Barroso, Kolotouchkina & Mañas-Viniegra, 2021).

The ageing population is a major concern of developed societies and constitutes one of the greatest challenges of the state of wellbeing due to the associated economic, social and political implications. In fact, the ever-increasing life expectancy is presenting serious challenges by putting the economic future of developed countries at risk (European Environment Agency, 2022; Jia, Lu & Wajda, 2015).

For the first time in history, in 2018 the number of people over the age of 65 exceeded the number of children under the age of 5 (United Nations, 2019). It is projected that in Europe the percentage of those aged 65 and over will increase from 18% in 2019, to 29.3% in 2100 (United Nations, 2019). The case of Spain is exceptional, as by 2050 it will be the country with the oldest population in the world, according to the estimations of global population prospect studies carried out by the United Nations (the UN). Forty percent of the Spanish population will be over 60 (United Nations, 2009).

For this segment of society, the use of e-commerce could become an extremely useful tool (Rybaczewska & Sparks, 2021). E-commerce and seniors currently appear distant realities, although the increasing ageing population in developed societies make it necessary to take advantage of the possibilities of autonomy which e-commerce provides (Ye & Yang, 2020; Llorente & Sáez-Díez, 2019). Moreover, businesses can obtain significant profits from these consumers, in general, without debts and a stable spending power. Recent world events which have led to a state of total lockdown, have exposed the limitations for seniors who do not shop on the Internet, as do other age groups (Haiteng *et al.*, 2021; Sala, Gaia & Cerati, 2020).

2. E-commerce, social media & seniors

Seniors continue to be one of the most vulnerable segments in the digital divide. Although, the latest data for 2019 reflects a small decrease of Spanish people between the ages of 65 and 74 had used the Internet in the last month of the year. Variances in the type of consumption continue to exist, excluding seniors from more complex and certain online activities, which highlights this generational gap in specific areas (INE, 2020). As a result, less than 15% of people between the ages of 65 and 74 had used e-commerce in the last three months, compared with 83.3% in the 25 to 34 age group (INE, 2020). Zniva and Weitzl (2016) showed that the majority of publications defined age as old when it reaches a critical value of either 55 years or 65 years depending on authors.

The data displays an increase in e-commerce among seniors, according to the Barómetro de Mayores UDP –Democratic Union of Pensioners in Spain– (2019), in 2017 36.5% shopped online, compared with 41.7% in 2019. The report "The truth about online consumers" (KPMG, 2017) found that seniors constitute a segment of the population with greater economic resources than others, and that they are more and more inclined to shop online.

The sustained growth of the total Internet population remains constant and accentuates the change in the global profile of Internet users in recent years. It highlights an intensification of Internet use in older age groups (over 50s), although it is slower in seniors above 65 (Fuente-Cobo, 2017). However, the profile of the online shopper continues to be similar to the traditional user profile: more intensive among men, the 25 to 49 age group, with secondary or university studies, with a medium and medium-high socio-economic level, and residents of urban habitats (ONTSI, 2020).

In the year 2020 in Spain, 93.2% of the population aged 16 to 74 years have used the Internet in the last three months, 2.5 points more than in 2019. Although the use of the Internet is a majority practice in young people from 16 to 24 years old, as age increases, their use decreases, where the group from 65 to 74 years presents the lowest percentage (INE, 2020).

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The result of the Barómetro Mayores UDP (2019) has shown that 55.8% of seniors perform online banking procedures, while 46.3% have carried out administrative procedures online. The most salient data is the purchasing (tickets, consumables, and other items) which occurs among those between 65 and 74 years of age (46.8%), those with university studies (70.1%), and those with an elevated spending power (57.1%), in respect to the average registered percentage of the total (41.7%).

Data on e-commerce in seniors is limited. As can be observed, almost all of the studies limit the sample age to 65. The Observatorio Cetelem is the only organisation which provides data above this age. Its latest study shows that in the sectors of tourism, leisure and mobile devices, and in general in electrical goods, the rate of shoppers has grown by 15 points. Shoppers continue to purchase leisure activities on the Internet (tickets for shows, books, restaurant reservations, music, and other items) which represents a growth of 22 points. In 2017, 10% of the consumers in the study claimed to have made various purchases on the Internet, 8% higher than in 2016.

The preferred channel for shopping on the Internet is the marketplace, which rates higher than in almost all sectors, the individual online shop and manufacturer. It is particularly notable that the average expenditure has increased, in addition to higher levels of credit and financing. One example presented in the report is that in the previous 12 months spending increased by 38%, a jump from €1,413 per person in 2016 to €1,954 in 2017. The sector with the highest level of credit and financing in e-commerce were found to be electronics, followed by tourism and fashion. According to this study, delivery costs continue to be an issue for shoppers despite more purchases being made from home than in physical shops.

The mobile phone is the preferred tool for e-commerce. In 2017, 56% of shoppers used a smartphone or tablet to shop, resulting in a 6-point increase in respect to 2016. In contrast to the mobile phone, social media, according to the Observatorio Cetelem, has not taken off when it comes to shopping and, in fact, has gone backwards. They believe that it is not a place for shopping despite those who have purchased through social media had a positive experience.

If, as indicated, these online shopping tendencies are observed, the marketplace is the new preferred channel for online shopping. Household appliances and technology, mobile devices and products related with bicycles, cars and motorbikes are acquired through this type of website. The reasons why the marketplace is preferred to the online or physical shop is the price, the variety of products, and the special offers and deals which users can find. The preferred payment methods with mobile devices were, first PayPal, second debit cards, and third credit cards. Fifty four percent of users claim to have used a collection point and 14% have used it to return an item.

A salient finding from the study is that 94% of those surveyed expect to shop online in the following 12 months. The preferred products are household appliances or technology, mobile phones and accessories, fashion: clothes, shoe wear and accessories among other items, and that the volume of purchases made online will depend on low prices, more secure transactions, and in the simplicity of the shopping process, in addition to other aspects.

With regards to the specific amount, seniors spend more than the average shopper on travel, food, health, beauty and leisure. As for the frequency of online purchases (single answer question) and those who claim to shop various times per week, seniors do so less than the average –6.2 compared with 10. With those who do so less than once a month, seniors represent 38.9 compared with a total average of 30.

In general, people in the age group of 45 to 75 experience the same barriers and concerns as the rest of the population. Notable ones include a lower fear of theft compared with home burglary, and that the product may be damaged in transit. However, having to pay for delivery is viewed as a more serious issue.

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Regarding the positive aspects of e-commerce, what is valued above all is the possibility to shop at any time of day. The reasons for purchasing more items online in general coincides with the average, except in terms of the payment method, 12.4 compared with 16 and the request for less data, 7.6 compared with 10. Fashion, accessories, toys, baby care products, and cars and accessories are the categories where seniors are below the average.

The behaviour of seniors differs to the rest of the population in certain aspects. Activity and motivation are observed, although barriers persist in specific aspects, which limits economic activity (Groeppel-Klein, Helfgen, Spilski & Schreiber, 2017; Sánchez-Valle, Llorente-Barroso & Abad-Alcalá, 2022).

The technological omnipresence of today's societies is apparent in the data of the ONTSI (2020). The report reveals that Internet connections in Spain are on the rise. In addition, in respect to the Internet use by demographic groups, the digital divide persists, although it is reduced as per the data of INE (2020) more than 65% of Spanish citizens between the ages of 65 and 74 claimed to have used the Internet in the previous month. In fact, variances in the type of consumption which excludes seniors from more complex and specific activities continues to exist, and this generational digital divide in concrete areas. In respect to e-commerce, only 13.5% of people between 65 and 74 years of age shopped online in the previous three months, compared with 83.3% of those between 25 and 34 years of age (INE, 2020). According to ONTSI (2019), e-commerce sales represented 17% of the total sales revenue for companies in Spain, in line with the average of the UE-28. Of the total number of Spanish businesses, 19% received online orders, exceeding the European average (17%). Fifty three percent of the population in Spain used the Internet to purchase goods or services, while in Europe the average was 60%.

The studies carried out on the elderly and the use of e-mail, although not very abundant, do offer relevant data. All agree that the use of technology plays a key role in giving independence to the elderly, but the difficulties encountered by this group are evident. The Internet contributes to active and autonomous aging that improves the quality of life of the elderly, therefore it represents a source of opportunities (Llorente *et al.*, 2018).

3. Methodology

As previously stated, the main goal of the paper is to study the preferences of seniors and their behaviors in relation with e-commerce. In line with the main objective, the following specific objectives were established:

O1. Analyze the perceptions and attitudes of the elderly towards e-commerce.
O2. Identify the main motivations and barriers related to its use.
O3. Understand the reasons why older people are or aren't attracted to these services.
O4. Identify proposals that can contribute to including the elderly in the use of e-commerce.

The research involved 405 seniors aged between 60 to 64 (30.9%), 65 to 69 (24.7%), 70 to 74 (36.3%) and 75 to 79 (8.1%) in Spain. A total of 58.8% men and 41.2%, women, all of them internet, were surveyed through a telephone questionnaire. The sample was obtained with a confidence level of 95% and with a sampling error for PQ= 0.50: 4.9% (PQ=0.75: 4.2% and PQ=0.90: 2.9%).

The questionnaire consisted of 23 dichotomous and Likert-scale questions (response intervals) about the use of the Internet in general –usage, level of online shopping or management, security, and trust in the digital environment– and about their experience with online purchase, especially regarding their level of autonomy, the difficulties that occur during the purchase process, the language, design and usability of web pages and the level of security perceived when making a purchase. Non-buyers through this channel were surveyed about the reasons on why they do not purchase on the Internet and about proposals that could encourage them to consume through this mean.

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The data is first analyzed by means of descriptive statistics to highlight aspects related to usage and confidence. Then a taxonomy of e-seniors based on the motivations and barriers in their digital purchasing behavior is proposed. This taxonomy will be identified by means of unsupervised learning methods, more precisely, cluster analysis (Kaufmann & Rousseeuw, 1990).

Two analyses were carried out, one for those who use online e-commerce and another one for those who do not. In both cases, the dataset was preprocessed in a standard way (Zamora *et al.*, 2020), removing missing values and identifying categorical values. All statistical techniques described below were carried out using R 4.0.1 under the front end RStudio 1.2.5001.

In order to perform clustering methods, there are, mainly, three steps to consider, namely, computing the dissimilarity matrix, performing the actual clustering method on that matrix, and validating the results (James *et al.*, 2013). Those steps lead to the choice of several hyperparameters, in other words, the choice of several decisions which should be taken by the analyst that affect the outcome of the study.

For all the choices above, several possibilities were tested for both cluster analyses, and it turned out that the best combination was the same both times. Several other combinations led to similar results (although not so precisely), which is also a great indicator of the robustness of the clustering which was performed, after all, if several methods achieve similar results, it is natural to conclude that an actual underlying reality is being described.

As for the dissimilarity matrix, it is important to stress that the study is in a high dimensional setting (with several variables) so it is advisable to start with a dimensionality reduction algorithm before computing the distances (James *et al.*, 2013). Several methods were considered[1], and ultimately the best results were achieved through the KODAMA algorithm[2] using k-Nearest Neighbors with k=5 (Cacciatore *et al.*, 2017) to reduce the dimensionality to 2 dimensions. Then, the dissimilarity matrix was defined using the Euclidean distance[3].

Afterwards, K-means clustering was selected as the best option to carry out the study with five clusters. The selection of the clustering algorithm and the optimal number of clusters were performed based on internal measures and stability measures. The internal measures have two purposes, firstly, to check that within each group the observations are sufficiently similar to each other, and secondly, to check if the groups are adequately separated. More precisely, the silhouette width computes the distance between each point and points in other clusters, connectivity measures to what extent each observation and its neighbors are in the same cluster, and the Dunn index is a ratio of the distance between each cluster and how big they are. Stability measures check the consistency and the robustness of the results, that is, whether observations are classified in the same groups even if one variable is removed. More specifically, APN measures the average proportion of observations that are placed in a different cluster using the full data and removing one column. AD measures the average distance between observations placed in the same cluster using the full data and removing one column. ADM measures the average of the distances between each of the centers of the clusters when using the full data and centers of the clusters obtained when one column is removed. Both internal and stability measures were implemented using clValid

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[1] PCA, KODAMA, ISOMAP and Shannon nonlinear mapping were tried for dimensionality reduction. The best dissimilarity matrix was selected using the Hopkins statistic (using the clustertend package).

[2] The KODAMA algorithm is a novel learning algorithm for unsupervised feature extraction and is specifically designed for analysing noisy and high-dimensional datasets. KODAMA works in a similar fashion to algorithms such as t-SNE, Shannon Nonlinear Mapping or ISOMAP, reducing the dimensionality of the dataset in a non-linear way so that meaningful groups are identified.

[3] Euclidean, Chevyshev, Manhattan, Minkowski, Canberra and Mahalanobis distances were also tried using the base and philentropy package (HG 2018).

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(Brock *et al.*, 2008). K-means was the choice with an optimal trade-off among all measures for both clusters conducted in this study.

Finally, the variables which played the most prominent role in identifying the differences between the groups were extracted and ranked. Additionally, bidimensional plots of the clustering were included, providing a graphical representation of how accurate the clusters are.

4. Results

We first present the descriptive results about usage and confidence when using online platforms. Of all those surveyed, 43.5% use the Internet for online banking procedures, such as movements and transfers, whereas online shopping activity rises to 60.2%, be it for leisure products and services, entertainment (shows, holidays and travel reservations) or other goods.

Particularly salient is that 91.4% of the sample (question 1) frequently use the WhatsApp application and 83% have the habit of reading the news and checking email (question 2). The behaviour regarding social media usage is more divided, with almost have of the sample not using any social media (question 3, 47.9%).

In relation to the level of confidence with e-commerce platforms 24.7% claim it to be low, 43% average, 28.1% high and 4.2% for those who consider it very high.

In relation to the level of ability to perform online purchases and procedures, 78% consider themselves as being low or average, 17.8% high, and only 4.2% as very high.

With respect to the evaluation of levels of digital skill required to shop on e-commerce platforms, the obtained results are salient. They indicate an average level of ability to manage such a task.

Table 1. Level of confidence, perceived capacity and perception of skills.

Confidence in online shopping platforms	Frequency	Percentage
Low	100	24.7%
Average	174	43%
High	114	28.1%
Very High	17	4.2%
Total	405	100%
Perceived capacity to perform procedures and shop online	Frequency	Percentage
Low	101	24.9%
Average	215	53.1%
High	72	17.8%
Very High	17	4.2%
Total	405	100%
Perception of required skills level to perform procedures and shop online	Frequency	Percentage
Low	76	18.8%
Average	192	47.4%
High	109	26.9%
Very High	28	6.9%
Total	405	100%

Source: Own elaboration.

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Table 2 displays the data obtained in relation to the levels of perceived security when performing a procedure or shopping online. The opinions reflect that 66.2% feel insecure, 15.8% feel an average level of security, and 18% rate it as high.

Table 2. Perception of security when shopping or performing online procedures online.

Perception of security when shopping or performing procedures online	Frequency	Percentage
Low	268	66.2%
Average	64	15.8%
High	73	18%
Total	405	100%

Source: Own elaboration.

4.1. *Results of the cluster analysis*

The results obtained from the cluster analysis are based on the description of the segmented sample, establishing the criteria of online "shoppers" or "non-shoppers." As explained in the methodology, several criteria are considered in order to determine the number of groups which provide the best description of the different profiles. Among the consumers who shop online, 4 groups are detected, whereas 7 typologies are detected for those who do not.

The resulting 11 groups are formed based on the responses to two types of questions: those regarding the shopping experience and those which refer to areas of improvement that commercial websites could implement on their sites.

In this manner, in relation to the barriers to and the motivators of shopping online, seniors display the following:

- Choose to shop online due to: convenience, range of offering, and competitive prices which result in savings.
- Choose to not shop online due to no perceived benefit.
- Perceive a feeling of convenience, as in the ease of being able to obtain information, compare prices and acquire products and services.
- Consider the reviews and recommendations of other users.
- Value the ease of use of the digital buttons and steps in the process.
- Feel more autonomous and self-sufficient: not requiring assistance from others and beginning to sell items on the Internet.
- Have the perception of greater confidence in, and security with these company websites.
- Value the ease of obtaining an order confirmation.

The second refer to the actions performed by the commercial platforms which encourage a more frequent use of the service:

- A simplified shopping process once a decision has been taken: the payment steps.
- The availability of telephone assistance to aid in the shopping process.
- The assurance of receiving the product.
- The possibility of payment on delivery.
- The option of assistant aided returns.
- The guarantee of a secure system for both financial and personal data.

4.1.1. Typology of user of e-commerce

The cluster analysis revealed 4 groups among to those who shop online. In Tables 3, 4 and 5 the most frequent responses provided by the subjects of each of the clusters can be observed and considered as defining the 'user type.' Table 3 displays the variables which describe the level of autonomy and experience of the various clusters, while table 4 reflects the barriers

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and needs, and table 5 the perception of security of commercial websites. The variables which define each cluster are related to the empowerment of the user: 'I don't require help from family or friends to shop online,' 'I feel better since shopping online,' and 'I'm not concerned about providing my bank details.'

Considering all these variables, distinct profiles of shoppers can be identified:

- Technophiles: consists of 122 surveyed individuals (C 1 in the tables) and is the most numerous group. They are the most autonomous with regards to shopping online, and they do not require assistance. They can manage any problem which arise during the process, even though they may be unclear on some of the steps. They move comfortably through these procedures and are confident with security and protection while providing both banking details and personal data during the payment step.

- Meticulous: fifty-six individuals form this second largest group (C 2). They display no barriers in the use of e-commerce. They first began online shopping with a friend or family member and now perform online procedures autonomously. They easily find the buttons to make their purchases, although when providing their data, they experience issues with session timeouts. They consider it very important that returns are actioned with an assistant and that the product is paid for on delivery only.

- Cautious: this third cluster, which consists of 39 people, is a group who display all the motivators presented, although they are uncertain about the steps in the shopping process, and they do not easily find the buttons. Consequently, they are very interested in having the option of returning the product if unsatisfied, and in receiving assistance during the process. They demonstrate an interest in all actions which enable a more appealing shopping website, except for an order confirmation.

- Distrustful: the fourth group by number of individuals is formed of 27 individuals (C4) and is the only one which has tried to buy and sell second-hand articles. They consider that online banking procedures are safer, and they ask for a system which guarantees the protection of their data as they are concerned about relinquishing it. They class it as very important that e-commerce provides the option of an assistant during the shopping process, payment on delivery, and that the whole process for returning products is managed by the company.

Table 3. Level of autonomy and experience of seniors with e-commerce.

Cluster	I need help from family or friends	I had help with my first purchase, but after I did it myself	If I have problems the first time, I don´t try again	I have tried to buy and sell second hand goods	I feel happier since I know how to shop online	I´m not sure about the different steps to shopping online	I easily find the buttons to move through the steps and confirm my purchase	When I take a long time to fill in the information, the session times out.	N
C 1	No	No	No	No	Yes	Yes	Yes	No	122
C 2	No	Yes	No	No	Yes	No	Yes	Yes	56
C 3	No	No	No	No	Yes	Yes	No	No	39
C 4	No	Yes	No	Yes	Yes	No	Yes	Yes	27

Source: Own elaboration.

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Table 4. Barriers and needs of e-commerce users.

Clusters	I can't touch the item until I buy it	Returning the item is a serious problem	If I could pay on delivery, I would buy more items	I would like to be able to call to request returns and then they take care of everything	I find it difficult to find the proof of purchase	I would like to have the option of online help while shopping	N
C 1	Not inter.	Not inter.	Not inter.	Not interesting	Not inter.	No	122
C 2	Not inter.	Not inter.	Very inter.	Very interesting	Not inter.	Yes	56
C 3	Quite inter.	Quite inter.	Quite v	Quite interesting	Not inter.	No	39
C 4	Very inter.	Very inter.	Very inter.	Very interesting	Not inter.	Yes	27

Source: Own elaboration.

Table 5. Perception of security of seniors with e-commerce.

Cluster	I feel uncomfortable shopping online because I worry about providing my personal data	I feel safer using online banking than shopping online	Sometimes I don't buy anything as I forget the password or I can't recover it	I would like to use a system that guaranteed the security of my personal data	N
C 1	No	No	No	No	122
C 2	No	Yes	No	No	56
C 3	No	No	No	No	39
C 4	No	Yes	No	Yes	27

Source: Own elaboration.

4.1.2. Non-users of e-commerce

For those who do not shop online, 7 groups were identified.

As per the responses to the previously detailed questions on the use of, attitude towards, and needs in commercial websites the following segmentation of non-users of e-commerce is observed:

- Indifferent: the most numerous profile is composed of 32 individuals (C 5). This group is defined by a lack of interest in online shopping; it appears complicated and requires the assistance of others to perform. They claim to be uninterested in any of the proposed enhancements. They do not make purchases and have no intention of doing so in the future.
- Reluctant: This group is formed of 31 subjects (C 6) who consider it complicated to perform digital purchases, and data security or the returns procedure is a serious barrier for them. They do not consider the improvement proposals of interest.
- Practical: this cluster of 29 individuals (C 7) is similar to the previous group (reluctant), both are uninterested in the presented enhancements as an incentive to shop online. Their difference between them is that they use websites as a source of information and price comparisons.

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- Optimistic: this cluster is formed of 22 subjects (C 8) who do not shop online as they feel insecure and doubt in the need to do so, although they do not find it complicated to purchase products and they are interested in the proposed improvements.
- Convenient: the group composed of 18 individuals (C 9) who consider that it is not complicated nor unsafe, and appreciate the need to perform online purchases, although someone else performs the process for them. They are very interested in enhancements to the shopping experience.
- Novice: this cluster is formed of 17 subjects (C 10) who identify themselves with all the barriers presented, although they display an interest in the proposed modifications to encourage use.
- Enthusiastic: the group is composed of 12 individuals (C 11) that find online shopping to be complicated, no one performs it for them and they feel insecure. Receiving or returning items is not a concern and they express great interest in an improved experience for the user.

5. Conclusions and discussion

This study of the profile of seniors over the age of 60 in relation to e-commerce contributes to the delimitation of aspects related to use, barriers and motivators of this segment of the population. Being a study based on probability sampling, general conclusions can be made from the findings which contribute to defining the digital divide of this demographic (Milner & Rosenstreich, 2013).

A main finding is that more than 60% carried out some form of online shopping on a commercial website. In addition, they claim to have a low-to-average level of digital skills to manage this type of action (78%); a low-to-average level of confidence in online platforms; and a low level of perceived security (66.2%). Furthermore, with an average level of digital skills (47.4%) they consider it possible to use these environments, which can be interpreted as a positive attitude and interest to acquire the necessary knowledge to make digital purchases.

Another relevant finding from the study is the segmentation of 11 profiles inside the original division between online shoppers and non-shoppers. In clusters 1 to 4, a constant pattern of skill is observed, such as not needing assistance from a third party to perform the process, overcoming any difficulties which arise during the process and restarting a session on expiry. In addition, a common aspect is empowerment, with individuals reporting a sense of self-sufficiency in this environment. Clusters 1 and 3 claim to have a similar experience, the 'cautious' group consider the adoption of measures to enhance the user experience quite interesting. Clusters 2 and 4, also claim to have almost identical barriers and motivators, except for the 'distrustful' (C 4) group who have dared to buy and sell second-hand products. Logically, both segments are very interested in proposals related to the possibility of being able to try on or out the product before paying, moreover the 'distrustful' cluster considers that not being able to touch the product before deciding is a barrier.

Among the non-shoppers, there is a greater segmentation with 7 groups being identified. There are two clear patterns, those who do not make purchases as they feel insecure, and furthermore, see no need (C 6, C 7, C 8) compared with the rest, who rely on others to perform the purchase and display a lack of interest in having greater digital skills or enhanced web experiences, except for cluster 8 'optimistic' who are open to acquiring such skills.

With respect to the type of improvements which e-commerce can implement to capture and incentivise use, the various clusters fall into two quite different positions, those who consider none of the proposals of interest (C 5, C 6, C 7) and those who, on the contrary, display a positive predisposition (C 8, C 9, C 10 y C 11). As a result, the first 3 groups show reluctance and a low level of interest to begin shopping online, whereas the rest are more open to adopt a change in habits (Rodríguez, 2019).

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In conclusion, the findings of this research reveal the existence of distinct taxonomies of seniors with their respective approaches to the digital shopping process. Moreover, the findings can be of use in strategic decision making for companies that so far have been treating this demographic as homogenous as well as in policy making. This commercial and social perspective could contribute to the integration of this segment of the population in the digital world (Barbolla, 2020).

One important issue is the large number of typologies of behaviour found, that reflect the complex situation of this segment of the population, however, one common characteristic exists: confidence as a determining factor for shopping online. Compared with the rest of the population, this demographic group questions more profoundly the factors that make a website secure, whereas with other age groups, this aspect is hardly contemplated. In addition, other features need to be considered, such as the design, accessibility, and usability, all notable causes of limitation and barriers. Ultimately, seniors, despite the gradual lessening of the digital breach, have and will continue to have greater and specific determinants when it comes to shopping online. Consequently, the segment of the population with the greatest growth potential requires special attention in order to adapt e-commerce to its needs, and at the same time those of businesses, thereby affecting its impact on the economy (Sánchez-Valle, Viñarás-Abad & Llorente-Barroso, 2017).

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