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MODELLING M-COMMERCE ADOPTION AMONG GENERATION Z IN THE PANDEMIC CONTEXT

***Abstract.** The development of online technologies and mobile apps have transformed the ways in which consumers buy and/or sell. Recently, the coronavirus pandemic has increased the usage of e-commerce and m-commerce around the world. Therefore, this study aims to investigate what drives mobile shopping apps adoption by generation Z during the pandemic. Drawing on the Technology Acceptance Model (TAM), this quantitative research shows that fear of COVID-19 exerted a positive effect on perceived usefulness of mobile apps. Furthermore, the*

perceived safety of mobile apps has a positive effect on perceived usefulness and perceived ease of use. Perceived usefulness has a direct influence on the intention to use mobile apps, and both a fear of COVID-19 and perceived safety have strong indirect effects on the intention to use an app. It can be argued that the research results are relevant from both theoretical and practical perspectives taking into consideration the development of m-commerce in the context of the COVID-19 pandemic.

Keywords: *mobile apps; Technology Acceptance Model; mobile commerce; perceived safety; COVID-19 fear; SEM;*

JEL Classification: M31, C51

1. Introduction

There is no doubt that social and technological challenges have transformed consumers' buying behaviours. The advancement of online technologies, the growing importance of the Internet, mobile applications, and social networks have led to changes in how consumers make buying decisions and how they shop. The online shopping environments are therefore evolving and becoming capable of offering more purchase options to the customers in addition contributing to the rise of mobile commerce. The outbreak of the COVID-19 pandemic has increased the frequency of e-commerce and mobile commerce usage among many consumers accustomed to purchasing various goods and services in a traditional way, in physical stores (Sardjono et al., 2021). In order to avoid the spread of the coronavirus, millions of people around the world choose digital channels as a safer alternative to conventional shopping.

Based on the Technology Acceptance Model, this study aims to reveal the main determinants of mobile shopping behaviour patterns of Gen Z, considering the effects of the COVID-19 pandemic. The study addresses the following research questions: *What are the factors that affect Gen-Z consumers' adoption of mobile applications while shopping? What is the impact of the COVID-19 pandemic and perceived safety on future intentions to use mobile apps?*

It can be argued that the findings of this study are important for both researchers and practitioners, as little is known about the mobile shopping behaviour of Gen Z consumers in Romania. In addition, the study contributes to the literature on the effects of COVID-19 on consumer shopping behaviour.

The article is structured as follows. The literature review presents the hypotheses of the study and the conceptual research model by drawing on Technology Acceptance Model (TAM). We continue with the methodology of the research and our sample. The authors then discuss the main findings of the study, and draw theoretical and practical implications in the conclusion section. Then follows the study's limitations and future research directions.

2. Literature Review and Hypotheses Development

TAM is considered the most effective model for assessing the factors that affect the use and adoption of new technology. Thus, the aim of the first research question is to test the relationships between these key factors of the TAM among Gen Z consumers and to determine their intention to use a mobile application in the future under the influence of specific variables, such as perceived usefulness and ease of use. Moreover, considering contemporary consumers who are increasingly concerned about the confidentiality and the use of personal data, the GDPR legislation and the security of electronic transactions, the present study also investigates consumers' perceptions regarding the safety of mobile applications. Furthermore, the social effects and fears associated with the COVID-19 pandemic, generated among consumers, were highlighted by investigating the possible influences of these anxieties on consumers' use of mobile applications. Therefore, the second research question aims to examine the effects of fear of COVID-19 and perceived safety of the mobile shopping apps on the intentions to use these apps in the future.

At the end of 2019, the entire world faced an unprecedented situation - the novel coronavirus pandemic. Due to its very fast spread rate, the entire scientific community, around the world, engaged to discover treatments, prevention methods, and vaccinations. In order to mitigate the spread of the new coronavirus, the prevention methods included: face mask wearing, social distancing, self-isolation, and minimising the contact with others. As a consequence of these prevention methods, many researchers have expressed a great deal of concerns about the population's mental health (Bitan et al., 2020). It was not surprising that fear was the most common feeling felt among the population during the pandemic, and, therefore, fear became chronic, recording the highest scores in specialised tests (Al-Marroof et al., 2020).

The recommendation for social distancing led to finding new solutions to avoid, as much as possible, the contact with other people. Thus, during the COVID-19 pandemic, home food delivery mobile applications became a practical solution in detriment of the traditional physical visit to restaurants (Al Amin et al., 2020). According to Prasetyo et al. (2021), if a consumer feels comfortable using a home delivery platform, it is possible for this consumer to use the platform more frequently in the future. The COVID-19 pandemic and the prevention measures, required by the authorities, have disrupted the consumer's normal behaviour, causing anxiety and fear (Untaru and Han, 2021). Fear can be described as a negative emotion that can cause psychological changes in consumer behaviour. The feeling of fear is a learning process that occurs during consumers' decision making process with a view to protecting them (Naeem, 2020). Under these circumstances, consumers had to find alternatives to perform their daily tasks (shopping, paying bills, ordering food, etc.). Thus, during the COVID-19 pandemic, to avoid frequent outings, mobile applications were the consumer's first choice. To summarise, the fear generated by the new coronavirus is closely

related to the most important factors in the TAM model, perceived usefulness and ease of use. Therefore, the authors propose the following hypothesis:

Hypothesis 1 (H1). Consumer's fear, generated by the COVID-19 pandemic (**FCOV-19**), significantly and positively influences the perceived usefulness (**PU**) of mobile shopping applications.

The feeling of insecurity, which can be felt by consumers regarding the use of mobile applications, is often associated with ambiguity and reduced use (Godoe and Johansen, 2012). Ambiguity can lead to the perception of a high level of complexity, which negatively influences the consumer's perception of the ease of use of the app. Humbani and Wiese (2019) have described the feeling of insecurity as the feeling of suspicion that consumers have about new technologies. Also, they point out that the discomfort caused by the feeling of insecurity can slow down the adoption of a new technology. Walczuch et al. (2007) showed that people who perceive a high level of discomfort in using a technology, automatically feel it to be as more complex and therefore more difficult to use. In addition, the likelihood of a loss that could be caused by the use of the new technology could also jeopardise the chances of the intention to use it (Walczuch, Lemmink and Streukens, 2007). The insecurity felt during the use of modern technologies seems to be much lower among young consumers. The "digital natives" generation uses technology to learn, socialise, spend their free time, or buy goods. Consequently, most Gen Zers are technology-skilled and they perceive online shopping as safe (Lestari, 2019).

Furthermore, testing the relationship between usefulness, ease of use, security, and intentions to use for mobile ai applications, Lai (2017) emphasised the existence of a significant link between users' perceptions of application security and the perceived ease of use of these applications. Based on this information, the authors hypothesise that:

Hypothesis 2 (H2). The perceived safety of mobile shopping applications (**P_SAFETY**) significantly and positively influences the perceived ease of use (**PEoU**) of these applications.

The safety concept has received a multitude of definitions; however, it is generally accepted that its main role is to control the access to a system's personal information from users (Fife and Orjuela, 2012). Consumers are generally concerned about security and privacy issues. Thus, when it comes to sharing personal information over the telephone or the Internet, they are very skeptic. By downloading and installing mobile applications, the users expose themselves to increased risks associated with personal data attacks or theft. By requesting irrelevant permissions or misusing permissions, mobile applications may even provide third parties with consumers' personal data (Barth et al., 2019). Consumers' concerns are also frequently related to authentication and unauthorised access to user payments and data, although, when it comes to this type of trade, the buying process should go smoothly (Chang et al., 2015). Over time, privacy issues have proven to be real barriers to the use of certain Internet

services. For instance, in Australia, the security of mobile applications has proven to be an obstacle in the adoption of online banking (Pikkarainen et al., 2004). In view of these findings, the authors offer the following:

Hypothesis 3 (H3). Perceived safety of mobile shopping applications significantly and positively influences the perceived usefulness of these applications.

The ease of use and perceived usefulness are the two variables that influence the intention to use technology in the TAM model (Williams, 2021). Perceived usefulness is defined as the extent to which consumers consider technology to improve their activity (Williams, 2021), by increasing their efficiency and job performance (Davis, 1989). Also, the concept of usefulness refers to the convenience that the application gives to the consumer regarding the fulfillment of the task that he has to perform (Wu and Wang, 2005).

Gen Z is a generation with a high level of technology attachment. Thus, the authors consider its importance and relevance to study the behaviour of Gen Zers vis-à-vis the adoption of mobile applications. In this context, Gen Z consumers' intention to use mobile shopping applications depends on their perceptions of usefulness and ease of use. Moreover, the perceived ease of use has a direct influence on the perceived usefulness of mobile apps. Thus, the following hypotheses were proposed:

Hypothesis 4 (H4). The perceived ease of use significantly and positively influences the perceived usefulness of mobile shopping applications.

Hypothesis 5 (H5). The perceived usefulness significantly and positively influences consumers' future intentions to use mobile shopping applications.

Hypothesis 6 (H6). The perceived ease of use significantly and positively influences consumers' future intentions to use mobile marketing applications. Based on the previous discussions, we proposed the following research model and hypotheses (Figure 1).

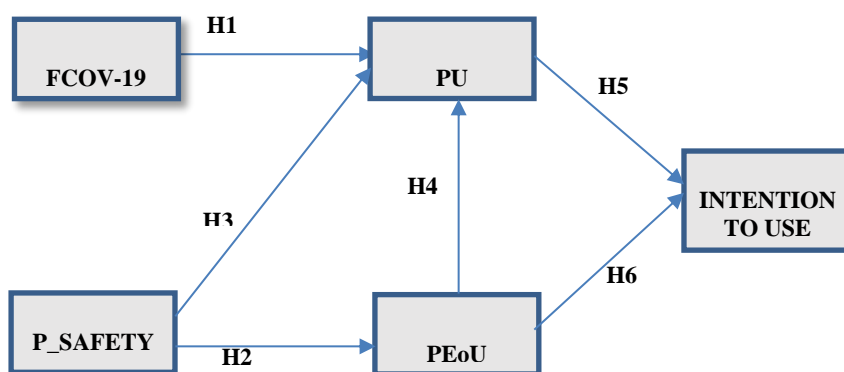


Figure 1: Research Model

3. Methodology

Young people belonging to Gen Z are heavy users of online shopping technologies, and they can easily adapt to a variety of different online shopping platforms (Van den Bergh and Behrer, 2016). Also, they are tech-savvy and demanding customers, with a rapidly growing purchasing power and totally different tastes and preferences, unlike prior generations. Moreover, they are taking into consideration mainly those companies or brands who are able to connect with them and enhance their experiences; therefore, grabbing and holding their attention is more challenging for retailers (Schlossberg, 2016). As a consequence, the retail industry has already started to interact with customers in a new way, known as mobile shopping (m-shopping) (Groß, 2015). Thus, retailers offer consumers a variety of products and services on the go, as mobile applications continue to emerge as a powerful and ubiquitous service delivery channel (McLean, Al-Nabhani and Wilson, 2018).

In order to test study hypotheses, the authors conducted quantitative research on Gen Z consumers. Research data was collected from a convenient sample of 276 young consumers in March 2021. Respondents were reached by email, and they were provided with the link to an online structured questionnaire. The online questionnaire had two sections. The first part included demographic questions along with the questions aimed to capture their online shopping habits during the pandemic. The second part consisted of Technology Acceptance Model scales, and perceived safety of mobile shopping apps scale. The last part of the questionnaire included questions to elicit participants' level of COVID-19 fear.

Two cases were excluded from data analysis due to inconsistent answers and missing responses, and as a result, data from 274 self-administered questionnaires were analysed. The mean age of the respondents was 20.8 years (range 18-43, sd.2.6). Most of the respondents had some college degree, 71% were female and 50.7% were single, 85% of them were (non-working) students. The authors note that 63% had an average monthly income below 300 EUR, and 67% of the participants reported that they carried out their main activity only from home, during the pandemic. They used mobile shopping apps during the pandemic mainly for buying products (81.4%) and for keeping track of the special offers (44.5%).

The study variables were identified based on an extensive literature review, multi-item reflective scales were employed to measure study variables (Table 1).

The Technology Acceptance Model Scale (TAMS) was used to measure perceived usefulness (PU) and perceived ease of use (PEoU) of mobile shopping apps. PU was measured by 5 items (Davis, 1989). The dependent variable was intentions to use mobile shopping apps in the future, which were measured by 3 items (Thakur, 2018). Perceived safety of the mobile shopping apps was captured by 5 items (Featherman and Pavlou, 2003). Fear of COVID-19 was measured by a 4-item scale (Bitan et al., 2020).

All measures were relied on 5-point Likert-type reflective scales ranging from 1 (strongly disagree) to 5 (strongly agree). We used translation (in Romanian) & back-translation (in English) procedures to maintain the semantic equivalence of the scales. Respondents' age, gender, education, income level, and employment status were also measured by direct questions.

4. Results

4.1. Descriptive Statistics

Prior to testing the validity and reliability of the measurement model, descriptive statistics of the scale items are calculated. Table 1 shows the means and standard deviations of the scale items along with the reliability coefficients.

Table 1. Descriptive statistics and reliability coefficients

Code	Item	M	SD	α
PU1	I can shop anytime I want through an app.	4,65	,607	.827
PU2	Mobile apps are a useful way to shop.	4,53	,652	
PU3	I'm more efficient when I use a mobile shopping app	4,00	,959	
PU4	I can better manage my shopping time.	4,05	,987	
PU5	Using the app makes my life easier	4,18	,883	
PEoU1	I'm learning fast to use a mobile app.	4,84	,378	.563
PEoU2	It's easy for me to use an application.	4,84	,381	
PEoU3	Navigating through a mobile app is intuitive.	4,17	,886	
PEoU4	The applications help you during their use.	4,11	,876	
IUSE1	I will use mobile applications for shopping and after the pandemic.	4,23	,866	.740
IUSE2	I will consider using mobile apps to shop in the future.	4,31	,768	
IUSE3	I will spend more through mobile applications.	3,32	1,062	
SAFE1	The security systems of the application offer me the expected protection.	3,69	,841	.87
SAFE2	Using mobile shopping apps is low risk.	3,53	,954	
SAFE3	The app is protecting by personal data	3,49	,977	
TR1	Mobile applications are reliable.	3,62	,848	
TR2	I think mobile app providers keep their promises.	3,57	,850	
FCOV1	I'm afraid of coronavirus infection.	3,50	1,171	.722
FCOV2	When I hear the news about the pandemic with the new coronavirus, I become anxious.	3,01	1,249	
FCOV3	There is a risk of infection when I go shopping.	3,84	1,012	
FCOV4	It is difficult to keep your physical distance from other people when shopping.	4,13	1,026	

4.2. Measurement Model and CFA

In order to validate the measurement model, a Confirmatory Factor Analysis (CFA) was performed. Initially, the data did not show a good fit to the model (CMIN/DF: 2.44, RMSEA: .073, GFI: .87, CFI: .88, TLI: .87). The measurement model had serious convergent and discriminant validity issues (CR for PEoU was less than 0.70; AVE's for PEoU and FCOV were less than 0.50). In addition, standardised factor loadings of PU1, PEoU3, PEoU4, IUUSE3, FCOV4 were below .50. Thus, we modified the model by deleting the PU1, PEoU3, PEoU4, IUUSE3, and FCOV4 to resolve the issues.

After the modifications, the CFA was run again. The fit statistics of the modified model showed a good fit to the data: CMIN/DF: 2.25; GFI: .917; TLI: .922; CFI: .939; RMSEA: .068. The scale items obtained acceptable standardised factor loadings (between .602 and .880); and reliability statistics (Table 2).

Table 2. Constructs' factor loadings and reliability

Construct	Indicators	Std. Loadings	α
Perceived Usefulness (PU)	PU5	0,822	.849
	PU3	0,817	
	PU2	0,695	
	PU4	0,693	
Perceived Ease of Use (PEoU)	PEoU1	0,880	.774
	PEoU2	0,717	
Intentions to Use (INTENTION)	IUSE1	0,866	.817
	IUSE2	0,803	
Perceived Safety (P_SAFETY)	SAFE1	0,849	.870
	TR2	0,831	
	TR1	0,721	
	SAFE3	0,714	
	SAFE2	0,691	
Fear of Covid-19 (FCOV-19)	FCOV2	0,784	.752
	FCOV1	0,750	
	FCOV3	0,602	

Table 3 shows composite reliability (CR) for internal consistency, average variance extracted (AVE) for convergent validity, maximum shared variance (MSV) along with correlation matrix of latent variables for discriminant validity. All of the CR values were greater than 0.7 and thus all the constructs are reliable (Hair et al., 2010). Convergent validity was supported with good standardised factor loadings (ranging between 0.602 and 0.880) of indicators for the respective constructs (Table 2) along with AVE values that are above the threshold of 0.5. All MSV values are less than AVEs, and the square root of AVEs is greater than interconstruct correlations, confirming no concerns about discriminant validity (Fornell and Larcker, 1981).

Table 3. Validity and Reliability Indicators

	CR	AVE	MSV	MaxRH	PSAFETY	PU	PEoU	INTENTION	FCOV
PSAFETY	0,874	0,584	0,256	0,887	0,764				
PU	0,844	0,576	0,399	0,856	0,506**	0,759			
PEoU	0,782	0,644	0,109	0,818	0,252**	0,330***	0,803		
INTENTION	0,822	0,698	0,399	0,828	0,337**	0,631***	0,230**	0,835	
FCOV	0,758	0,513	0,032	0,775	0,001	0,159*	-0,039	0,178*	0,716

Table 4 shows Heterotrait-monotrait (HTMT) ratio of the correlations among the study constructs. HTMT results indicate no issues regarding discriminant validity according to HTMT₈₅ criterion. These findings clearly indicate that the measurement model with three reflective constructs established convergent & discriminant validity and reliability.

Table 4. HTMT Analysis (Source: data analysis, author’s own work)

	PSAFETY	PU	PEoU	INTENTION
PSAFETY				
PU	0,514			
PEoU	0,265	0,322		
INTENTION	0,366	0,611	0,226	
FCOV	0,006	0,183	0,037	0,202

4.3. Structural Model and Hypothesis Tests

Before testing the specific hypotheses, the overall fit of the structural model was examined. The overall fit indexes of the structural model were satisfactory: $\chi^2= 211,530$, $df=96$; $CMIN/DF: 2.203$; $GFI: .917$; $TLI: .925$; $CFI: .940$; $RMSEA: .066$. We tested direct and indirect causal relationships between the structures, based on a bootstrap test with 5000 re- samples. Table 5 shows path coefficients and corresponding significance levels, %95 bias corrected confidence intervals and coefficients of determination. Also, Figure 2 reveals the structural model and parameter estimates as resulted from the study.

Based on a bootstrap test with 5000 re- samples (Preacher, Rucker and Hayes, 2007), it was found that FCOV exerted a significantly positive direct effect on PU ($\beta = .177$, $p < 0.05$). Furthermore, PSAFETY exerted significantly positive direct effects on PU ($\beta = .452$, $p = 0.01$) and PEoU ($\beta = .252$; $p < 0.001$). These findings provided support for H1, H2, and H3.

Consistent with H4; PEOU exerted a significantly positive effect on PU ($\beta = .222$; $p = 0.008$). PU posed a strong and significantly positive effect on INTENTION ($\beta = .627$, $p < 0.001$), supporting H5. However, PEOU did not exert a significant effect on INTENTION ($\beta = .024$; $p = 0.758$); hence, we could not find enough evidence to support H6.

Table 5. Results of Path Analysis (Source: data analysis, author's own work)

Regression Path	Effect Type	Std. Estimates	95% bias-corrected CI		p	Var. Expl. (R ²)	Results
			Lower	Upper			
FCOV → PU	Direct	,177	,030	,326	,017	,335	H1 supported
PSAFETY → PU	Direct	,452	,326	,564	,001		H3 supported
PEoU → PU	Direct	,222	,077	,370	,008		H4 supported
PSAFETY → PEoU	Direct	,252	,127	,370	,000	,063	H2 supported
PU → INTENTION	Direct	,627	,478	,755	,000	,404	H5 supported
PEoU → INTENTION	Direct	,024	-,119	,180	,758		H6 not supported
FCOV → INTENTION	Indirect	,111	,021	,215	,015		
PSAFETY → INTENTION	Indirect	,324	,232	,418	,000		
PEoU → INTENTION	Indirect	,139	,049	,249	,007		
PSAFETY → PU	Indirect	,056	,019	,119	,004		
PEoU → INTENTION	Total	,163	,014	,316	,034		
PSAFETY → PU	Total	,508	,395	,607	,000		

In addition, PU was found to mediate the relationship between FCOV and INTENTION. Path analysis revealed a statistically significant indirect effect of FCOV on INTENTION ($\beta = .111$; $p < 0.05$) through PU. A stronger indirect effect on INTENTION was exerted by PSAFETY through PU and PEOU ($\beta = .324$; $p < 0.001$). Another interesting finding is that, although PEOU did not exert any significant direct effect on INTENTION, path analysis indicated a significant indirect effect of PEOU on INTENTION ($\beta = .139$; $p = 0.007$) through PU. The 95% bias- corrected and accelerated confidence intervals (lower and upper levels) of the indirect effects do not contain zero. These findings clearly indicate that PU is a significant mediator between external variables and future intentions to use mobile shopping apps. Yet, it also plays a mediating role between perceived ease of using mobile apps and future intentions to use the apps (total effect $\beta = .163$; $p = 0.034$).

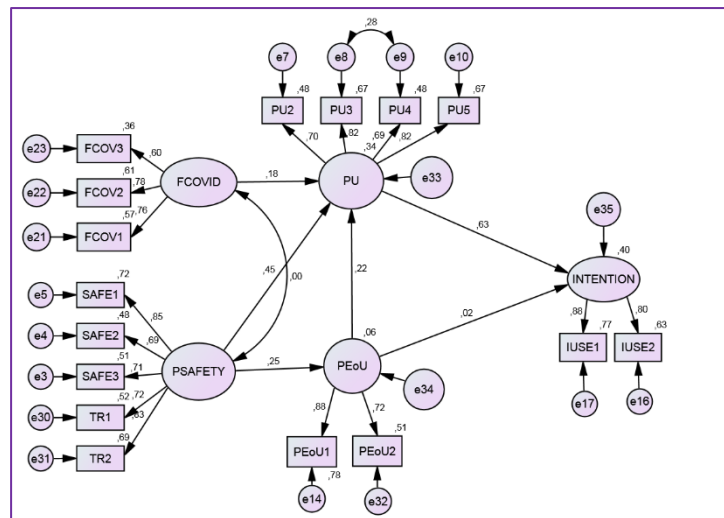


Figure 2. Structural Model and Parameter Estimates

On the other hand, the effect of perceived safety on perceived usefulness is strengthened by the mediating role of perceived ease of use (total effect $\beta = .508$; $p < 0.01$). PU and PEoU together accounted for 40.4% of the total variation in intentions to use mobile shopping apps. Finally, perceived safety, fear of COVID-19, and perceived ease of use together accounted for 33.5% of the total variation in perceived usefulness of mobile shopping apps.

5. Discussion

The aim of the present research was to investigate the drivers for adopting mobile applications by Gen Z consumers, taking into account the psychological and social effects of the Coronavirus pandemic in Romania.

The perceived usefulness of mobile shopping applications proved to have the strongest significant positive effect on consumers' intention to use mobile apps in the future, which confirmed H5. This pattern of behaviour may be due to the pragmatism of Gen Z because they are the ones who went through a financial crisis.

Another hypothesis that was supported by the present research is H1, meaning that the fears or anxiety generated by the Coronavirus pandemic among consumers significantly, positively affects the perceived usefulness of mobile applications. As we can see, external factors, unrelated to the performance of mobile applications, but concerning current social crisis, have direct effects on consumer perceptions regarding the role of the modern technologies. At the same time, the path analysis identified a statistically significant indirect effect of the COVID-19 fear on intention to use mobile apps in the future, which is mediated by its perceived usefulness.

The fear of COVID-19 was mainly perceived by respondents as the difficulty to keep physical distance from other people when shopping and by the existence of a risk of infection when shopping in conventional retail stores, meaning that mobile apps are useful for decreasing interactions in the buying process. However, fears were related in a lower extent with the global pandemic context, such as the general fear of coronavirus infection or the consumer anxiety under the impact of coronavirus news. The explanation may lie in the lower concerns of Gen Z about their personal risk of COVID-19 infection, given the less severe effects of the disease on young people compared to other age groups.

According to the path analysis, the perceived safety of mobile applications significantly, positively influences the perceived usefulness of these apps among young consumers, which supports H3.

The research results also supported H2, showing that the perceived safety of mobile applications significantly, positively affects the perceived ease of use of these apps among consumers. Moreover, data analysis showed there are statistically significant indirect effects of perceived safety on intention to use mobile apps in the future, which are mediated by both perceived usefulness and perceived ease of use.

The ease of use is perceived by the respondents as how fast they learn to use a mobile app and how easy it is for them to use the app. They also assess the extent to which it may be intuitive to navigate through a mobile app, and if the applications help consumers during their use.

Another finding of the present study was that the perceived ease of use of mobile applications significantly positively influences the perceived usefulness of these apps among consumers, leading to the acceptance of hypothesis H4. Therefore, it can be noticed that people belonging to Gen Z prefer devices they can easily interact with, as a consequence of the early exposure that this generation had to technology and the habit developed of having access to information without difficulties and as quickly as possible.

The only hypothesis that has not been confirmed by the results of this research is H6, meaning that perceived ease of use of mobile applications did not exert a significant direct effect on consumer intention to use mobile apps in the future.

The distancing measures and health protection will have significant implications for both businesses and consumers in the future years. For this reason, app adoption makes consumers less anxious and increase the perception on safety shopping. From this perspective, companies are required to focus on developing the consumer experience in mobile shopping environments. Future research can focus on other stress factors that affect consumers and the manner in which a mobile app can be useful for consumers who avoid that stress factor.

6. Conclusions

The present research contributes to the mobile commerce theory and practice. The authors firmly believe that these research results are of particular interest as they may confirm the specific behavioural patterns exhibited by Gen Z toward online shopping technology. As young people have already achieved great expertise and experience in using mobile apps, spending enough time on these platforms, they have probably come to consider the adoption of mobile apps as a hygiene factor, a way in which they can avoid stress factors, such as fear of COVID-19. Moreover, they probably have passed over the learning stage in accessing mobile apps and have little or no functional difficulties in using them. From this perspective, they expect from businesses to integrate mobile apps in their interaction mechanisms with customers.

Gen Z is an important market segment for retailers operating in the online environment, therefore having better knowledge about the behavioural patterns of young individuals in using mobile apps could be helpful in the marketing planning process of these companies. According to the research results, firms are recommended to increase the usefulness of their mobile apps for consumers, to promote the convenience and availability of these tools at any time, to add functionalities that improve buying efficiency and allow time saving in shopping acts, given the direct positive impact on intentions to use. This is even more important as the fear of COVID has increased consumer awareness of the usefulness of mobile applications in avoiding physical interactions during shopping, which could be an opportunity for retailers to advertise about the role of mobile shopping apps in decreasing the risk of infection with COVID-19. Moreover, mobile apps developers need to build a strong image in terms of the protection provided by the security systems of the applications and their reliability, so as to gain customer trust in increasingly using these technologies.

The present study focused on a limited number of variables, especially related to consumer perceptions about the main features of mobile shopping apps, as well as the psychological effects of the COVID-19 pandemic in terms of individual anxiety or fear. However, consumer intentions to use mobile apps in the future could also develop under the impact of other factors, including personality, values, attitudes, opinions, beliefs, and lifestyle characteristics of individuals. Future studies may also try to address other demographic segments, such as the Millennials or the Generation X, which constitute other important target audiences for e-retailers, especially due to their increased purchasing power and limited free time, even if they are not as technology prone. Simultaneously, sociocultural characteristics may be added in selecting the target population of future studies, furthermore, the status of opinion leaders of certain individuals (bloggers, social media influencers) in promoting an increased usage of mobile shopping apps. Moreover, as Gen Z is generally considered to be less brand loyal, future research aiming to determine the drivers of their behavioural and attitudinal loyalty toward mobile shopping apps might be a challenge.

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